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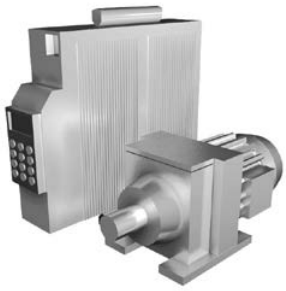

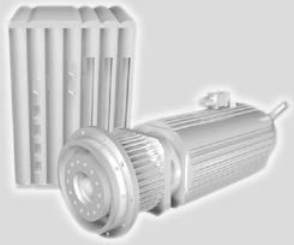

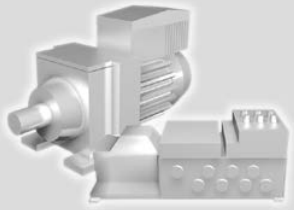

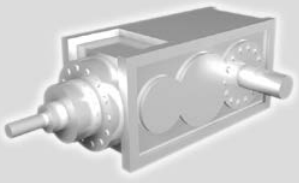

# Fieldbus Interface DFS11B PROFIBUS DP-V1 with PROFIsafe

Edition 09/2007

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Manual


SEW EURODRIVE

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**1 Important Notes ..... 6**
1.1 Explanation of symbols ..... 6
1.2 Integral part of the product ..... 6
1.3 Documentation reference ..... 6
1.4 Liability for defects ..... 7
1.5 Product names and trademarks ..... 7
1.6 Waste disposal ..... 7

**2 Safety Notes ..... 8**
2.1 Preliminary information ..... 8
2.2 General safety notes ..... 8
2.2.1 General safety notes for bus systems ..... 8
2.3 Transport / storage ..... 8
2.4 Installation / assembly ..... 9
2.5 Startup / operation ..... 9

**3 Introduction ..... 10**
3.1 Content of this manual ..... 10
3.2 Additional documentation ..... 10
3.3 Features ..... 11
3.3.1 MOVIDRIVE®, MOVITRAC® B and PROFIBUS ..... 11
3.3.2 Access to all information ..... 11
3.3.3 Cyclical and acyclical data exchange via PROFIBUS DP ..... 11
3.3.4 Acyclical data exchange via PROFIBUS DP-V1 ..... 11
3.3.5 Configuring the PROFIBUS option card ..... 12
3.3.6 Monitoring functions ..... 12
3.3.7 Diagnostics ..... 13
3.3.8 Fieldbus monitor ..... 13

**4 Integrated Safety Technology ..... 14**
4.1 Safety concept for PROFIsafe fieldbus interfaces ..... 14
4.2 Safety concept for MOVIDRIVE® and MOVITRAC® ..... 15
4.2.1 Limitations ..... 15
4.2.2 Schematic representation of the safety concept taking MOVIDRIVE® MDX61B as example ..... 16

**5 Safety Conditions ..... 17**
5.1 Requirements on the installation ..... 17
5.1.1 F-DO connection ..... 17
5.1.2 24 V voltage supply ..... 17

**6 Assembly and Installation Instructions ..... 18**
6.1 Installing the DFS11B option card in MOVIDRIVE® MDX61B ..... 18
6.1.1 Before you start ..... 19
6.1.2 Installing and removing option cards ..... 20
6.2 Installing the DFS11B option card in MOVITRAC® B ..... 21
6.2.1 SBus connection for individual unit ..... 21
6.2.2 System bus connection ..... 23
6.3 Assembling and installing the UOH11B gateway housing ..... 25
6.4 Connection and terminal description of the DFS11B option ..... 26
6.5 Wiring diagram for safe technology ..... 27
6.5.1 Wiring of individual MOVIDRIVE® MDX61B and MOVITRAC® B ..... 27
6.5.2 Group connection of MOVIDRIVE® MDX61B and MOVITRAC® B ..... 29

6.6 PROFIBUS pin assignment ... 31
6.6.1 Connecting MOVIDRIVE® / MOVITRAC® B / PROFIBUS ... 31
6.6.2 Baud rates greater than 1.5 MBaud ... 31
6.7 Shielding and routing bus cables ... 32
6.8 Bus termination ... 32
6.9 Setting the station address ... 33
6.10 Operation indicators of the DFS11B option ... 34
6.10.1 PROFIBUS LEDs ... 34

**7 Project Planning and Startup ... 36**
7.1 Validity of the GSD files for DFS11B ... 36
7.2 Project planning of PROFIBUS / PROFIsafe with MOVIDRIVE® GSD file ... 36
7.2.1 GSD file for PROFIBUS DP-V1 ... 36
7.2.2 Project planning procedure ... 37
7.2.3 DP configurations for MOVIDRIVE® MDX61B ... 38
7.3 Project planning for DP master with MOVITRAC® or gateway GSD file ... 41
7.3.1 GSD file for operation in MOVITRAC® B and UOH11B gateway housing ... 41
7.3.2 PROFIBUS DP master startup ... 42
7.3.3 Configuring the PROFIBUS DP interface ... 43
7.3.4 Operating mode (DP-V1 mode) ... 46
7.3.5 Auto setup for gateway operation ... 47
7.4 Setting the MOVIDRIVE® MDX61B drive inverter ... 49
7.5 Setting the MOVITRAC® B frequency inverter ... 50
7.6 Project planning of PROFIsafe with STEP7 ... 52
7.6.1 Hardware structure ... 52
7.6.2 Installing the GSD file ... 53
7.6.3 Configuring the DFS in HW Config ... 54
7.6.4 Project planning for a new configuration ... 55
7.6.5 Setting the parameters of the PROFIsafe properties ... 56
7.6.6 Description of the F-parameters ... 56
7.6.7 Safety diagnostics using PROFIBUS DP ... 58
7.6.8 Response times of PROFIsafe option DFS ... 60
7.7 Procedure for starting up DFS11B with MOVIDRIVE® MDX61B ... 61
7.7.1 Preliminary work ... 61
7.7.2 Switch on MOVIDRIVE® MDX61B with DC 24 V or AC 400 V ... 62
7.8 Procedure for starting up DFS11B with MOVITRAC® B (gateway) ... 64
7.8.1 Preliminary work ... 64
7.8.2 Switch on the units with DC 24 V or AC 400 V ... 64

**8 PROFIBUS DP operating characteristics ... 67**
8.1 Data exchange with the DFS11B option ... 67
8.1.1 Mapping the DFS in the address range of the PLC ... 68
8.1.2 F periphery DB of PROFIsafe option DFS ... 69
8.2 Controlling the MOVIDRIVE® MDX61B drive inverter ... 71
8.2.1 Control example for SIMATIC S7 with MOVIDRIVE® MDX61B ... 72
8.2.2 PROFIBUS DP timeout (MOVIDRIVE® MDX61B) ... 72
8.2.3 Fieldbus timeout response (MOVIDRIVE® MDX61B) ... 72
8.3 Controlling the MOVITRAC® B inverter (gateway) ... 73
8.3.1 Control example for SIMATIC S7 with MOVITRAC® B (gateway) ... 74
8.3.2 SBus timeout ... 74
8.3.3 Unit error ... 74
8.3.4 Fieldbus timeout of the DFS11B in gateway operation ... 75
8.4 SIMATIC S7 example program ... 75

8.5 Parameter setting via PROFIBUS DP ... 76
8.5.1 Structure of the 8 byte MOVILINK® parameter channel ... 76
8.5.2 Reading a parameter via PROFIBUS DP (READ) ... 79
8.5.3 Writing a parameter via PROFIBUS DP (WRITE) ... 80
8.5.4 Parameter setting procedure with PROFIBUS DP ... 81
8.5.5 Parameter data format ... 81
8.5.6 Return codes for parameterization ... 82
8.5.7 Special cases ... 83

**9 PROFIBUS DP-V1 Functions ... 85**
9.1 Introduction to PROFIBUS DP-V1 ... 85
9.1.1 Class 1 master (C1 master) ... 86
9.1.2 Class 2 master (C2 master) ... 86
9.1.3 Data sets (DS) ... 86
9.1.4 DP-V1 services ... 87
9.1.5 DP-V1 alarm handling ... 87
9.2 Characteristics of SEW inverters ... 88
9.3 Structure of the DP-V1 parameter channel ... 89
9.3.1 Procedure for setting parameters via data set 47 ... 91
9.3.2 DP-V1 master processing sequence ... 92
9.3.3 Addressing connected inverters ... 93
9.3.4 MOVILINK® parameter requests ... 93
9.3.5 PROFIdrive parameter orders ... 98
9.4 Configuring a C1 master ... 103
9.4.1 Operating mode (DP-V1 mode) ... 103
9.4.2 Example program for SIMATIC S7 ... 104
9.4.3 Technical data DP-V1 for MOVIDRIVE® DFS11B ... 109
9.4.4 Technical data DP-V1 for the gateway operation and MOVITRAC® ... 109
9.4.5 Error codes of the DP-V1 services ... 110

**10 Operating MOVITOOLS® MotionStudio via PROFIBUS ... 111**
10.1 Introduction ... 111
10.2 Required hardware ... 112
10.3 Required software ... 112
10.4 Installation ... 112
10.5 Configuring SIMATIC NET ... 113
10.6 Configuring the SEW communication service ... 116
10.6.1 Establishing communication ... 116
10.6.2 Procedure ... 117
10.7 Known problems when operating MOVITOOLS® MotionStudio ... 119

**11 Fault Diagnostics ... 120**
11.1 Diagnostic procedures ... 120
11.2 Error list in gateway operation ... 123
11.3 Error table PROFIsafe option DFS11B ... 124

**12 Technical Data ... 125**
12.1 DFS11B option for MOVIDRIVE® MDX61B ... 125
12.2 DFS11B option for MOVITRAC® B and gateway housing UOH11B ... 126
12.3 DFS11B safety part for MOVIDRIVE® MDX61B and MOVITRAC® B ... 127

**13 Index ... 128**

# 1 Important Notes

## 1.1 Explanation of symbols

**Always observe the safety and warning information in this documentation.**

**Electrical hazard**
Possible consequences: Severe or fatal injuries.

**Hazard.**
Possible consequences: Severe or fatal injuries.

**Hazardous situation**
Possible consequences: Slight or minor injuries.


**Harmful situation**
Possible consequences: Damage to the unit and the environment.

Tips and useful information.

## 1.2 Integral part of the product

The manual is a component of the DFS11B PROFIBUS DP-V1 fieldbus interface and contains important information for operation and service.

## 1.3 Documentation reference

- You must adhere to the information in the documentation to ensure:
  - Fault-free operation
  - Fulfillment of any rights to claim under limited warranty
- Consequently, read through this manual carefully before you start installation and startup of inverters with the DFS11B PROFIBUS option card.
- This manual assumes that the user has access to and is familiar with the MOVIDRIVE® and MOVITRAC® documentation, in particular the MOVIDRIVE® MDX60B / 61B and MOVITRAC® B system manuals.

## 1.4 Liability for defects

Incorrect handling or undertaking any action that is not specified in this manual could impair the properties of the product. In this case, you lose any right to claim under limited warranty against SEW-EURODRIVE GmbH & Co KG.

## 1.5 Product names and trademarks

The brands and product names named in these operating instructions are trademarks or registered trademarks of the titleholders.

## 1.6 Waste disposal

**Please follow the current national regulations.**

Dispose of the following materials separately in accordance with the country-specific regulations in force, as:

- Electronics scrap
- Plastics
- Sheet metal
- Copper

etc.

# 2 Safety Notes

- **You are only allowed to perform installation and startup of the DFS11B fieldbus interface when observing applicable accident prevention regulations and the MOVIDRIVE® MDX60B / 61B and MOVITRAC® B operating instructions.**

## *2.1 Preliminary information*

**The following safety notes apply to the DFS11B PROFIBUS DP-V1 fieldbus interface.**

**Please also consider the supplementary safety notes in the individual sections of this manual.**

## *2.2 General safety notes*

**Never install damaged products or take them into operation.**

Submit a complaint to the shipping company immediately in the event of damage.

### 2.2.1 General safety notes for bus systems

The communication system allows you to adjust the MOVIDRIVE® / MOVITRAC® inverters to your specific application very accurately. **As with all bus systems, there is a risk of invisible, external (as far as the inverter is concerned) modifications to the parameters which give rise to changes in the inverter behavior. This may result in unexpected (not uncontrolled) system behavior.**

## *2.3 Transport / storage*

**Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Inform the shipping company immediately in the event of a damage. Do not operate the product if it is damaged.**

Use suitable, sufficiently rated handling equipment if necessary.

**Possible damage caused by incorrect storage!**

Store the unit in a dry, dust-free room if it is not to be installed straight away.

## *2.4 Installation / assembly*

Observe the notes in section 6, "Assembly and Installation Notes".

## *2.5 Startup / operation*

Observe the notes in section 7, "Project Planning and Startup."

# 3 Introduction

## *3.1 Content of this manual*

This user manual describes

- How to install the PROFIBUS / PROFIsafe® DFS11B option card in the MOVIDRIVE® MDX61B drive inverter.
- How to use the PROFIBUS / PROFIsafe® DFS11B option card in the MOVITRAC® B frequency inverter and in the UOH11B gateway housing.
- How to start up MOVIDRIVE® with the PROFIBUS fieldbus system.
- How to start up MOVITRAC® B with the PROFIBUS gateway.
- How to configure the PROFIBUS using GSD files.
- How to configure PROFIsafe®.
- How to operate MOVITOOLS® MotionStudio via PROFIBUS.

## *3.2 Additional documentation*

For information on how to connect MOVIDRIVE® / MOVITRAC® straightforwardly and effectively to the PROFIBUS fieldbus system, you should request the following publications about fieldbus technology in addition to this user manual about the PROFIBUS option:

- MOVIDRIVE® Fieldbus Unit Profile manual
- MOVITRAC® B system manual
- MOVIDRIVE® MDX61B system manual
- Manuals on MOVITRAC® B safe disconnection
- Safe Disconnection for MOVIDRIVE® MDX60B/61B manual

The manual for the MOVIDRIVE® Fieldbus Unit Profile and MOVITRAC® B system manual describe the fieldbus parameters and their coding, as well as explains the whole range of various control concepts and application options in the form of brief examples.

The 'Fieldbus Unit Profile and Parameter List' for MOVIDRIVE® manual contains a list of all drive inverter parameters. These parameters can be read and written via the various communication interfaces, such as system bus, RS-485, and fieldbus interface.

## 3.3 Features

With the DFS11B option and its powerful universal fieldbus interface, the MOVIDRIVE® MDX61B drive inverter and the MOVITRAC® B frequency inverter allow for a connection to higher-level automation systems via PROFIBUS / PROFIsafe®.

### 3.3.1 MOVIDRIVE®, MOVITRAC® B and PROFIBUS

The unit behavior of the inverter which forms the basis of PROFIBUS operation is referred to as the unit profile. It is independent of any particular fieldbus and is therefore a uniform feature. This feature allows the user to develop fieldbus-independent applications. This makes it much easier to change to other bus systems, such as DeviceNet.

### 3.3.2 Access to all information

MOVIDRIVE® MDX61B / MOVITRAC® B offer digital access to all drive parameters and functions via the PROFIBUS interface. The drive inverter is controlled via fast, cyclic process data. Via this process data channel, you can enter setpoints such as the setpoint speed, ramp generator time for acceleration/deceleration, etc. as well as trigger various drive functions such as enable, control inhibit, normal stop, rapid stop, etc. At the same time you can also use this channel to read back actual values from the drive inverter, such as actual speed, current, unit status, error number or reference signals.

### 3.3.3 Cyclical and acyclical data exchange via PROFIBUS DP

While process data exchange usually takes place cyclically, drive parameters can be read and written acyclically via functions such as READ or WRITE or via the MOVILINK® parameter channel. This parameter data exchange enables you to implement applications in which all the important drive parameters are stored in the master programmable controller, so that there is no need to make parameter settings manually on the drive inverter itself.

### 3.3.4 Acyclical data exchange via PROFIBUS DP-V1

The PROFIBUS DP-V1 specification introduced new acyclical READ / WRITE services as part of the PROFIBUS DP expansions. These acyclical services are added to the current cyclical bus operation in special telegrams to ensure compatibility of PROFIBUS DP and PROFIBUS DP-V1.

### 3.3.5 Configuring the PROFIBUS option card

Generally, the PROFIBUS option card has been designed so that all fieldbus-specific settings, such as the station address and the default bus parameter can be made using hardware switches on the option card. This manual setting means the drive inverter can be integrated into the PROFIBUS environment and switched on within a very short period of time.

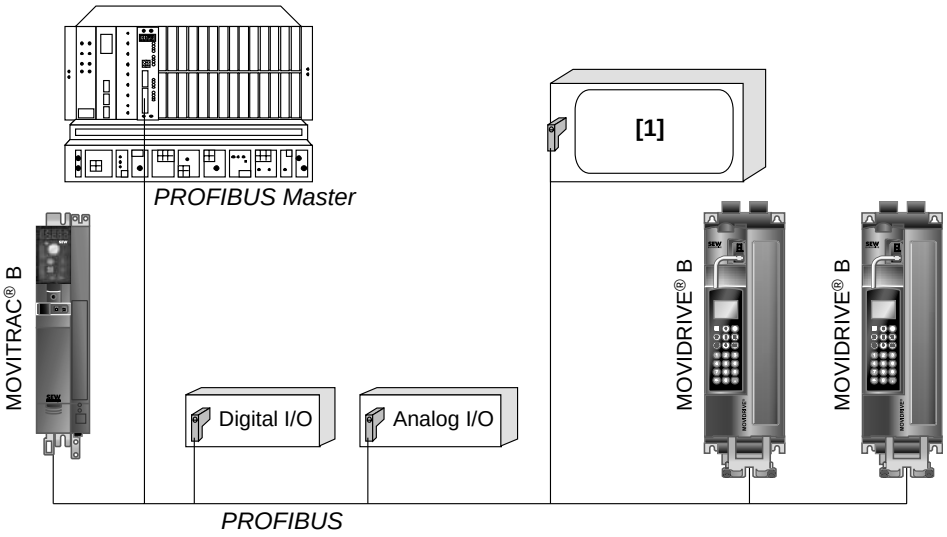


*Figure 1: PROFIBUS with MOVIDRIVE® and MOVITRAC®*

[1] Visualization

### 3.3.6 Monitoring functions

Using a fieldbus system requires additional monitoring functions for the drive technology, for example, time monitoring of the fieldbus (fieldbus timeout) or rapid stop concepts. You can, for example, adapt the monitoring functions of MOVIDRIVE® / MOVITRAC® specifically to your application. You can determine, for instance, which of the drive inverter's error responses should be triggered in the event of a bus error. A rapid stop is useful for many applications. You can also 'freeze' the last setpoints so the drive continues operating with the most recently valid setpoints (for example, conveyor belt). As the range of functions for the control terminals is also guaranteed in fieldbus mode, you can continue to implement rapid stop concepts using the terminals of the drive inverter, irrespective of the fieldbus used.

### 3.3.7 Diagnostics

The MOVIDRIVE® drive inverter and the MOVITRAC® B frequency inverter offer you numerous diagnostics options for startup and service. For example, you can use the integrated fieldbus monitor to control setpoint values sent from the higher-level controller as well as the actual values.

### 3.3.8 Fieldbus monitor

Furthermore, you are supplied with a variety of additional information about the status of the fieldbus interface. The fieldbus monitor in conjunction with the MOVITOOLS® MotionStudio PC software offers you an easy-to-use diagnostic tool. In addition to setting all drive parameters (including the fieldbus parameters), the tool displays the fieldbus and unit status information in detail.

# 4 Integrated Safety Technology

## *4.1 Safety concept for PROFIsafe fieldbus interfaces*

- Within the DFS.. PROFIsafe interface, PROFIsafe fieldbus interfaces are equipped with an integrated safety-oriented electronics components with a failsafe output (F-DO). The safety concept of this component is based on a safe status for all safety-oriented process variables. For this PROFIsafe interface DFS.., this is the value "0" for the F-DO output.
- The following requirements are fulfilled by means of a 2-channel redundant system structure of the safety component with suitable monitoring mechanisms:
  - SIL3 according to EN 61508
  - Category 4 according to EN 954-1
  - Performance level e according to EN ISO 13849-1

  When the system detects a fault, the system responds by reverting to a safe status. This makes the safety function available in the form of a failsafe input connected to a higher-level safety control via the PROFIsafe communication. The safe output on the safety component of the DFS interface is neither evaluated locally nor processed logically.
- The safe output F-DO can be used to disable the 24 V input "Safe stop" at X17 of the MOVIDRIVE® /MOVITRAC® inverter and in this way safely disconnects the drive. Refer to the safety concept described in the following for MOVIDRIVE® / MOVITRAC® inverters as well as all safety notes, requirements and installation instructions in this manual.

**Important:**

**The safety function of MOVIDRIVE® / MOVITRAC® is only permitted for applications up to category 3 according to EN 954-1.**

## 4.2 Safety concept for MOVIDRIVE® and MOVITRAC®

- In case of danger, any potential risk to a machine must be eliminated as quickly as possible. Standstill with restart prevention is generally the safe condition for preventing dangerous movements.
- The MOVIDRIVE® MDX61B and MOVITRAC® B drive inverters are characterized by the optional connection of an external fail-safe, approved emergency stop relay (according to safety category 3, EN 954-1). The emergency stop relay disconnects all active elements (disconnection of the safety oriented 24 V power supply of the output stage control) that generate the pulse trains to the power output stage (IGBT) when a connected control device (E-STOP button with latching function) is activated.
- Disconnecting the 24 V at the positive and negative poles ensures that the supply voltages required for operating the inverter and consequently for generating a rotating field of pulse patterns (which allow the generation of a rotating field) are safely interrupted. Automatic restart is prevented in this way.
- Instead of galvanic separation of the drive from the power supply by means of relays or switches, the disconnection of the 24 V supply described here safely prevents the control of the power semiconductors in the drive inverter. This process disconnects the rotating field generation for the respective motor. The individual motor cannot develop any torque in this state even though the mains voltage is still present.
- The requirements for the emergency stop relay are clearly defined in the following sections and must be strictly observed.

**Using a suitable external circuit via an emergency stop relay with**

– **Approval for at least safety category 3**

– **Disconnection for at least safety category 3**

**allows for operating the MOVIDRIVE® MDX61B and MOVITRAC® B drive inverters with safe disconnection according to stop category 0 or 1 (to EN 60204-1) and ensures protection against restart according to safety category 3 (to EN 954-1).**

### 4.2.1 Limitations

- **If the DC 24 V link voltage is safely disconnected at the positive pole only, no test pulses must be applied to this pole in disconnected condition.**
- **Important: The safety concept is only suitable for performing mechanical work on system/machine components.**
- **Important: A system/machine-specific risk analysis must be carried out by the system/machine manufacturer and taken into account for operation of the MOVIDRIVE® MDX 61B and MOVITRAC® B inverters.**
- **Danger of fatal injury: When the 24 V voltage supply is disconnected, mains supply voltage is still present on the drive inverter's DC link.**
- **Important: If work is carried out on the electrical section of the drive system, the supply voltage must be disconnected using an external maintenance switch.**

### 4.2.2 Schematic representation of the safety concept taking MOVIDRIVE® MDX61B as example

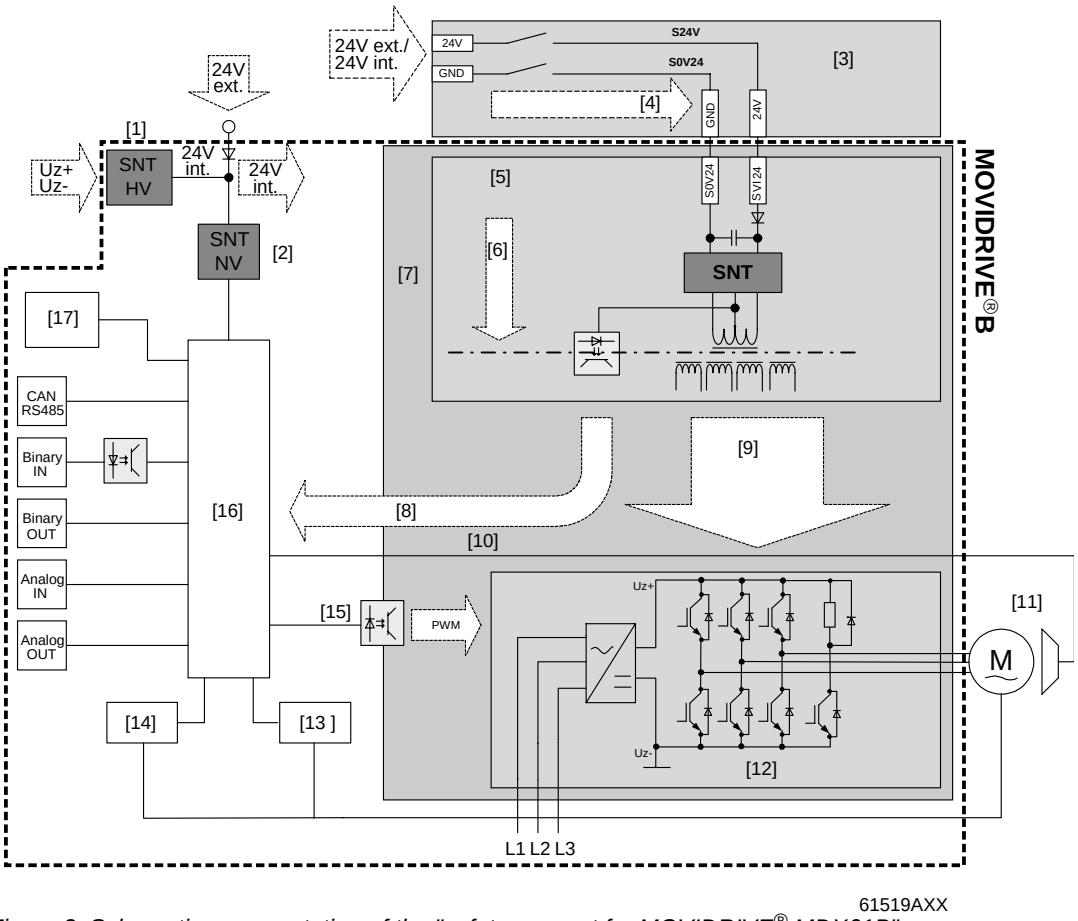


*Figure 2: Schematic representation of the "safety concept for MOVIDRIVE® MDX61B"*

[1] High voltage switched-mode power supply
[2] Low voltage switched-mode power supply
[3] Emergency stop relay (external) approved for at least category 3 according to EN 954-1
[4] Safety-oriented 24 V voltage supply
[5] Safety switched-mode power supply (SNT)
[6] Galvanic isolation
[7] Safety circuit
[8] Feedback to the central processing unit: Voltage supply for output stage control OK (not in safety circuit)
[9] Voltage supply for control of the power transistors
[10] 24 V safety switched-mode power supply disconnected / brake applied (not in safety circuit)
[11] Motor
[12] Power section
[13] Temperature detection
[14] Position sensing
[15] Pulse width modulated signals for output stage
[16] Central processing unit
[17] Fieldbus interface

This representation also applies to MOVITRAC® B.

# 5 Safety Conditions

For information on the safety-relevant conditions, refer to the following documents:

- "MOVIDRIVE® MDX60B / 61B Safe Disconnection – Conditions" manual
- "MOVITRAC® B Safe Disconnection – Conditions" manual

## *5.1 Requirements on the installation*

### 5.1.1 F-DO connection

- The maximum current load of the F-DO safety-related binary output is DC 1 A.
- The safety-related binary output is 2-pole, designed as P-M switch, and controlled via PROFIsafe® by a higher-level safety control.
- Actuators must generally be connected with the safe output F-DO with a 2-pole connection between the P switch output and the M switch output (F-DO_P and F-DO_M).
- It is not permitted to make a 1-pole connection between F-DO_P and the GND reference potential as doing so would cause an error as soon as the output is controlled.
- Internal testing of the safe output is cyclical. However, when decoupling takes place, the test pulses at the connection terminals are not visible and need not be taken into account during operation.

### 5.1.2 24 V voltage supply

The 24 V supply voltage(s) of the DFS11B and all stations connected to the fieldbus must be designed as safety extra-low voltage. The voltage must lie within the limits defined in the technical data. Besides, the following voltage values must not be exceeded if a fault occurs (according to EN 60950): Max. DC 60 V, max. DC 120 V for 200 ms.

# 6 Assembly and Installation Instructions

This section contains information about assembly and installation of the DFS11B option card in MOVIDRIVE® MDX61B, MOVITRAC® B and UOH11B gateway housing.

## *6.1 Installing the DFS11B option card in MOVIDRIVE® MDX61B*

**Only SEW-EURODRIVE engineers may install or remove option cards for MOVIDRIVE ® MDX61B.**

- **Users may only install or remove option cards for MOVIDRIVE® MDX61B sizes 1 to 6.**
- **Plug the DFS11B option card into the fieldbus slot [1].**


62268AXX

[1] Fieldbus slot

### 6.1.1 Before you start

The DFS11B option card must be plugged in the fieldbus slot.

**Observe the following notes before installing or removing an option card:**

- Disconnect the inverter from the power. Switch off the DC 24 V and the supply voltage.
- Take appropriate measures to protect the option card from electrostatic charge (use discharge strap, conductive shoes, and so on) before touching it.
- **Before installing** the option card, remove the keypad and the front cover.
- **After installing** the option card, replace the front cover and the keypad.
- Keep the option card in its original packaging until immediately before you are ready to install it.
- Hold the option card by its edges only. Do not touch any components.

### 6.1.2 Installing and removing option cards

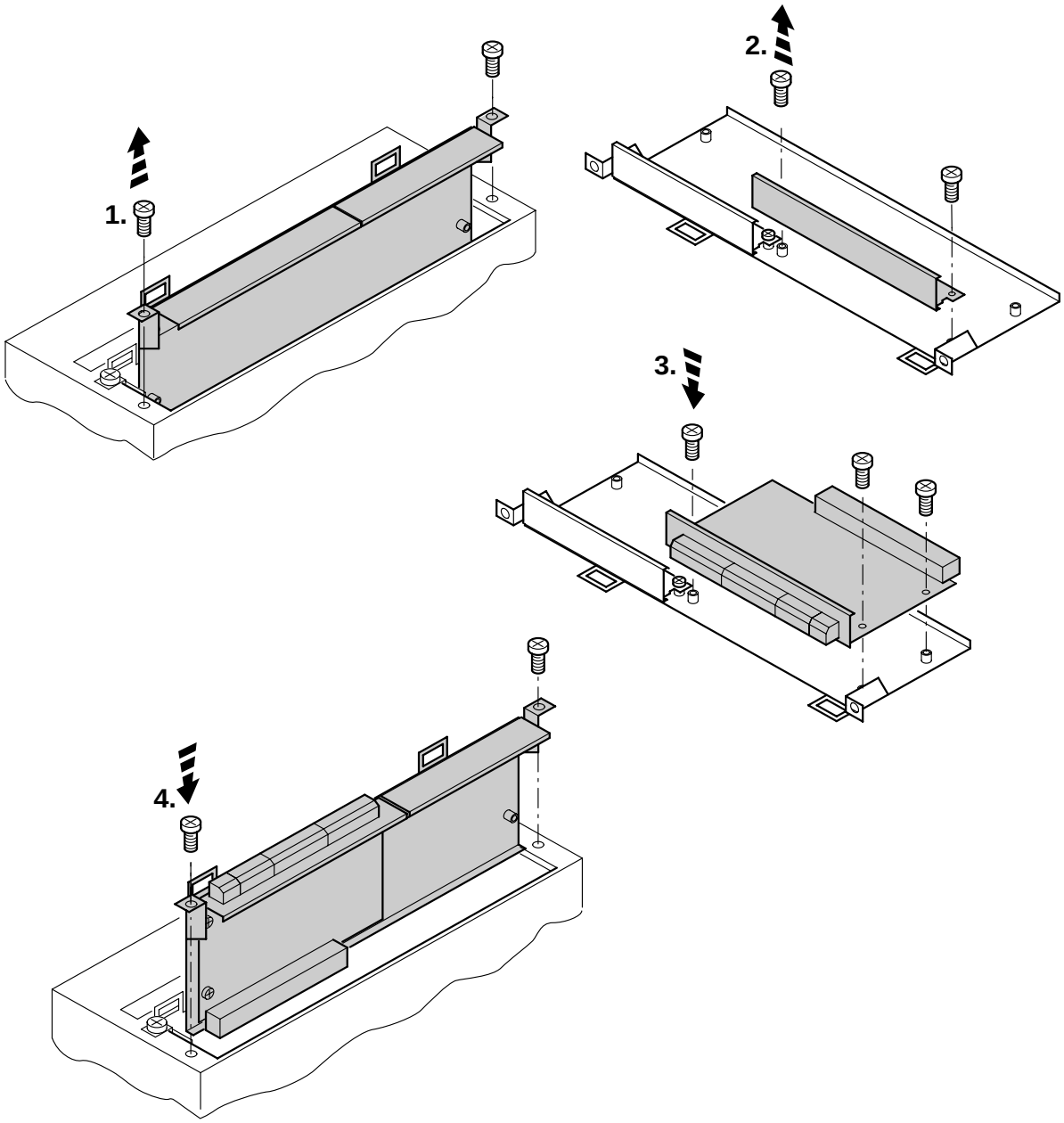


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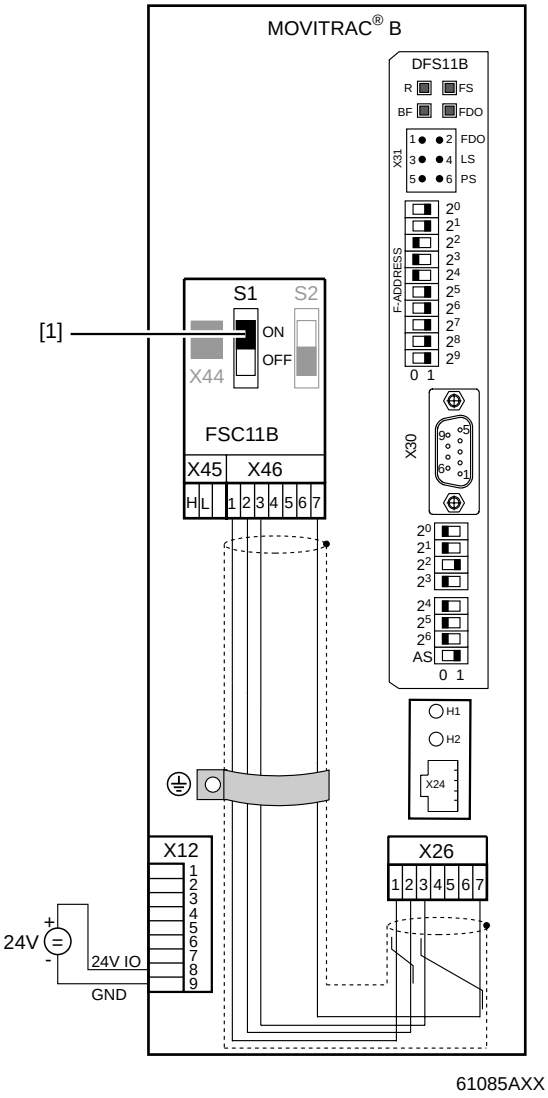
*Figure 3: Installing an option card in MOVIDRIVE® MDX61B sizes 1 to 6*

1. Remove the two retaining screws holding the card retaining bracket. Pull the card retaining bracket out evenly from the slot (do not twist!).
2. Remove the two retaining screws of the black cover on the card retaining bracket. Remove the black cover.
3. Position the option card onto the retaining bracket so that the three retaining screws fit into the corresponding bores on the card retaining bracket.
4. Insert the retaining bracket with installed option card into the slot, pressing slightly so it is seated properly. Secure the card retaining bracket with the two retaining screws.
5. To remove the option card, follow the instructions in reverse order.

## *6.2 Installing the DFS11B option card in MOVITRAC® B*

- MOVITRAC® B does not require special firmware status.
- Only SEW-EURODRIVE engineers are allowed to install or remove option cards for MOVITRAC® B.

### 6.2.1 SBus connection for individual unit

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[1] Terminating resistor activated, S1 = ON

The DFS11B features an integrated SBus terminating resistor and must therefore always be installed at the beginning of the SBus connection.

The address of the DFS11B option card is always 0.

| X46 | X26 | Description |
|---|---|---|
| X46:1 | X26:1 | SC11 SBus +, CAN high |
| X46:2 | X26:2 | SC12 SBus –, CAN low |

| X46 | X26 | Description |
|---|---|---|
| X46:3 | X26:3 | GND, CAN GND |
| X46:7 | X26:7 | DC 24 V |

| X12 | Description |
|---|---|
| X12:8 | +24 V input |
| X12:9 | GND reference potential for the binary inputs |

| X31 | Description | |
|---|---|---|
| X31:1 | Safe output | F_DO_M |
| X31:2 | Safe output | F_DO_P |
| X31:3 | Supply of the safe output | GND |
| X31:4 | Supply of the safe output | 24V_LS |
| X31:5 | Power supply to control electronics | GND |
| X31:6 | Power supply to control electronics | 24V_PS |

| Description of the LEDs | |
|---|---|
| **LED** | **Meaning** |
| R | RUN – Component status (green) |
| BF | BUS FAULT – Bus status (red, if a fault occurs, else disabled) |
| FS | Status of the safety option (green during standard operation) |
| FDO | Status of the safe output (orange) |

To simplify cabling, the DFS11B can be supplied with DC 24 V from X46.7 of the MOVITRAC® to X26.7.

MOVITRAC® B must be supplied with DC 24 V at terminals X12.8 and X12.9 when it supplies the DFS11B option.

The line length of the supply voltages 24V_LS and 24V_PS must not exceed 30 m.

### 6.2.2 System bus connection

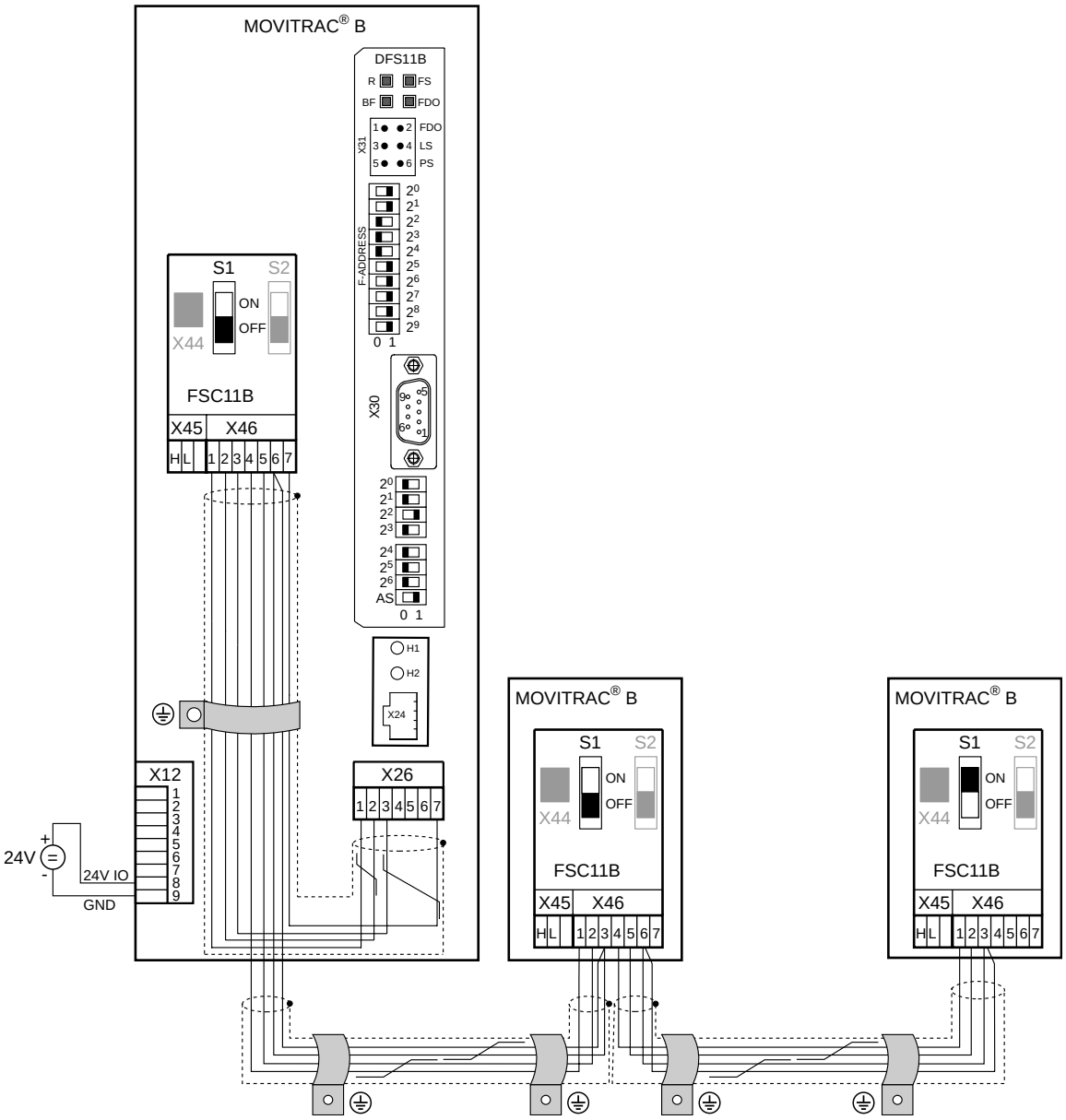


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*Figure 4: System bus connection*

| DFS | Description |
|---|---|
| GND | System bus reference |
| SC11 | System bus high |
| SC12 | System bus low |

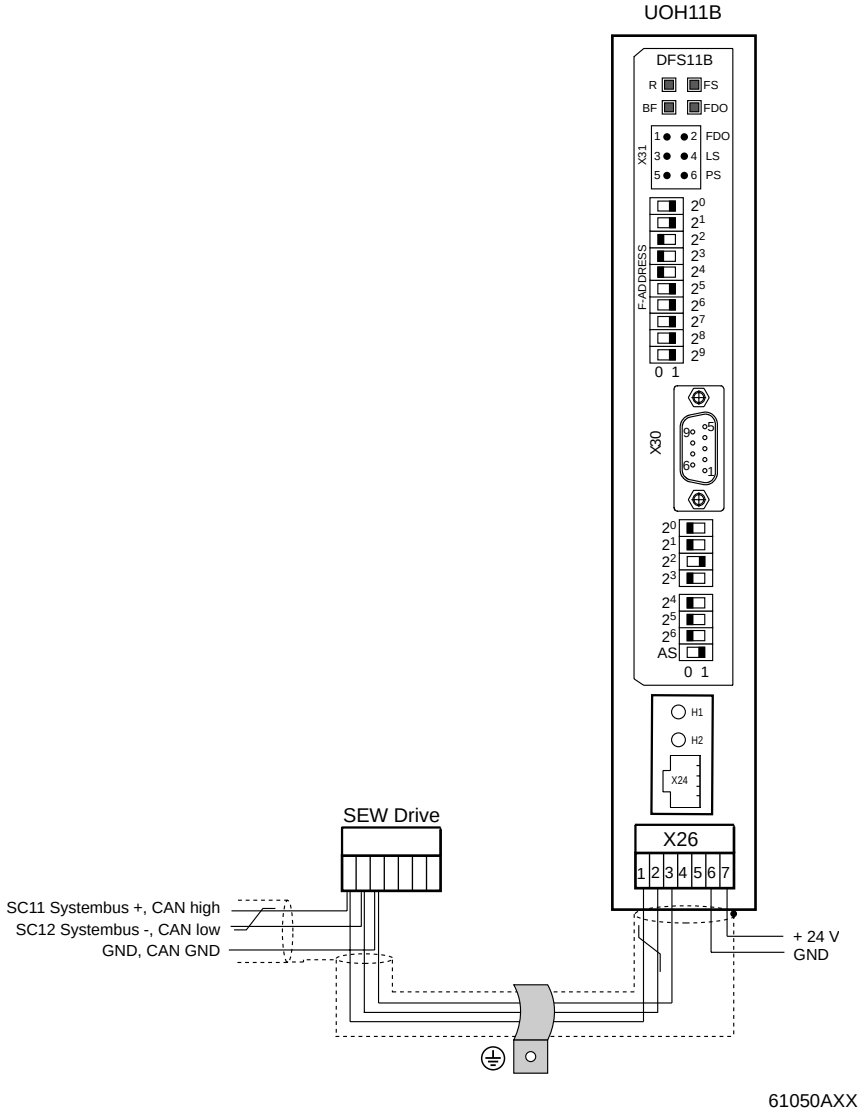
| MOVITRAC® B | Description |
|---|---|
| GND | System bus reference |
| SC22 | System bus low, outgoing |
| SC21 | System bus high, outgoing |
| SC12 | System bus low, incoming |
| SC11 | System bus high, incoming |
| S12 | System bus terminating resistor |

Please note:

- Use a 2 x 2-core twisted pair and shielded copper cable (data transmission cable with braided copper shield). Connect the shield flatly on both sides of the electronics shield clamp of MOVITRAC®. Also connect the ends of the shield to GND. The cable must meet the following specifications:
  - Core cross section 0.75 $mm^2$
  - Line resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m at 1 kHz
- The permitted total cable length depends on the baud rate setting of the SBus:
  - 250 kBaud: 160 m
  - 500 kBaud: 80 m
  - 1000 kBaud: 40 m
- Connect the system bus terminating resistor (S1 = ON) at the end of the system bus connection. Switch off the terminating resistor on the other units (S1 = OFF). The DFS11B gateway must always be connected either at the beginning or the end of the system bus connection and have a permanently installed terminating resistor.


- There must not be any potential displacement between the units connected with the SBus. Take suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.
- Point-to-point wiring is not permitted.

## *6.3 Assembling and installing the UOH11B gateway housing*




| **X26** | |
|---|---|
| X26:1 | SC11 system bus +, CAN high |
| X26:2 | SC12 system bus -, CAN low |
| X26:3 | GND, CAN GND |
| X26:6 | GND, CAN GND |
| X26:7 | DC 24 V |

The gateway housing has a power supply of DC 24 V that is connected to X26.

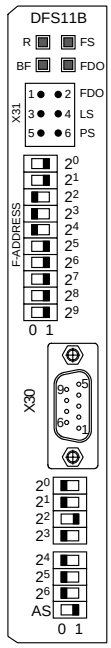
Connect the system bus terminating resistor at the end of the system bus connection.

## 6.4 Connection and terminal description of the DFS11B option

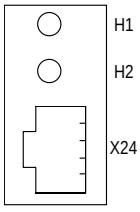
***Part number*** PROFIBUS / PROFIsafe® interface type DFS11B option: 1820 9629

The "PROFIBUS interface type DFS11B" option can only be used in conjunction with MOVITRAC® B and MOVIDRIVE® MDX61B, not with MOVIDRIVE® MDX60B.

The DFS11B option must be plugged in the fieldbus slot.

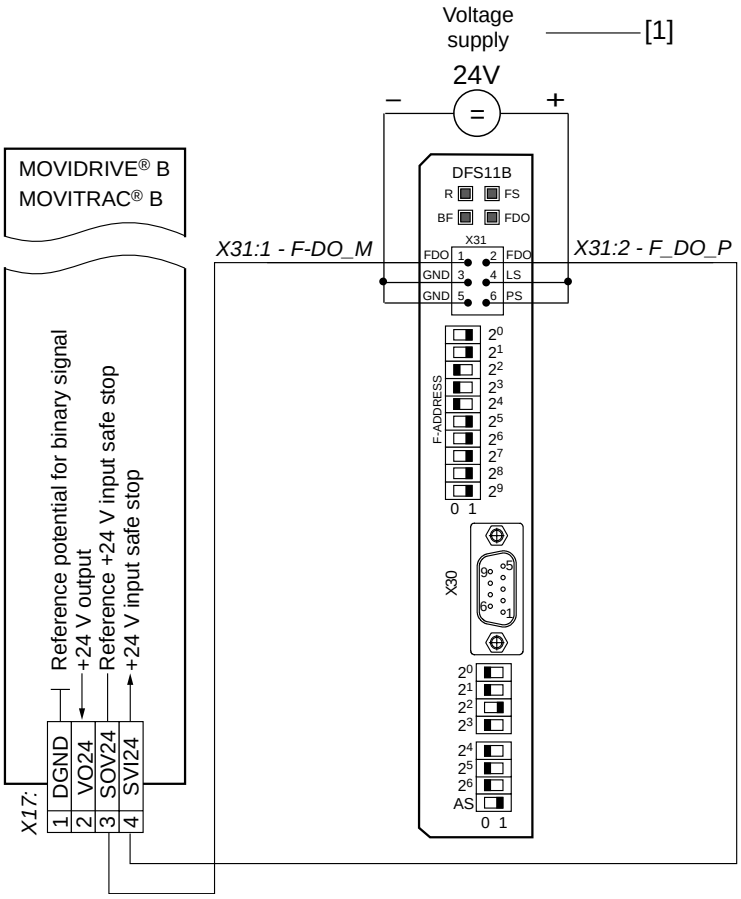
| Front view of DFS11B | Description | DIP switch Terminal | Function |
|---|---|---|---|
|  <br>61048AXX | **Diagnostic LEDs:** | **R**<br>**FS**<br>**BF**<br>**FDO** | RUN – Component status (green)<br>Failsafe status – Status of the safety option (green during standard operation)<br>BUS FAULT – Bus status (red if a fault occurs, else disabled)<br>Failsafe output – Status of the safe output (orange) |
| | **X31 connection** | **1 (F_DO_M)**<br>**2 (F_DO_P)**<br>**3 (GND)**<br>**4 (24 V_LS)**<br>**5 (GND)**<br>**6 (24 V_PS)** | Safe output<br>Safe output<br>Supply of the safe output<br>Supply of the safe output[1)]<br>Power supply to control electronics<br>Power supply to control electronics[1)] |
| | **F-ADDRESS: DIP switch for setting the failsafe address** | **$2^0$**<br>**$2^1$**<br>**$2^2$**<br>**$2^3$**<br>**$2^4$**<br>**$2^5$**<br>**$2^6$**<br>**$2^7$**<br>**$2^8$**<br>**$2^9$** | Significance: 1<br>Significance: 2<br>Significance: 4<br>Significance: 8<br>Significance: 16<br>Significance: 32<br>Significance: 64<br>Significance: 128<br>Significance: 256<br>Significance: 512 |
| | **X30: PROFIBUS connection** | **X30:1**<br>**X30:2**<br>**X30:3**<br>**X30:4**<br>**X30:5**<br>**X30:6**<br>**X30:7**<br>**X30:8**<br>**X30:9** | N.C.<br>N.C.<br>RxD/TxD-P<br>CNTR-P<br>DGND (M5V)<br>VP (P5V/100 mA)<br>N.C.<br>RxD/TxD-N<br>N.C. |
| | **ADDRESS: DIP switch for setting the PROFIBUS station address** | **$2^0$**<br>**$2^1$**<br>**$2^2$**<br>**$2^3$**<br>**$2^4$**<br>**$2^5$**<br>**$2^6$**<br>**AS** | Significance: 1<br>Significance: 2<br>Significance: 4<br>Significance: 8<br>Significance: 16<br>Significance: 32<br>Significance: 64<br>Auto setup for gateway operation |

1) The 24 V supply voltage(s) of the DFS11B and all stations connected to the fieldbus must be designed as safety extra-low voltage. The voltage must lie within the limits defined in the technical data. Besides, the following voltage values must not be exceeded if a fault occurs (according to EN 60950): Max. DC 60 V, max. DC 120 V for 200 ms.

| Front view of MOVITRAC® B, DFS11B and UOH11B | Description | Function |
|---|---|---|
|  <br>58129axx | **LED H1 (red)** | System error (only for gateway functions) |
| | **LED H2 (green)** | Reserved |
| | **X24 X terminal** | RS-485 interface for diagnostics via PC and MOVITOOLS® MotionStudio<br>(only applies to MOVITRAC® B) |

## 6.5 Wiring diagram for safe technology

### 6.5.1 Wiring of individual MOVIDRIVE® MDX61B and MOVITRAC® B

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[1] The 24 V supply voltage(s) of the DFS11B and all stations connected to the fieldbus must be designed as safety extra-low voltage. The voltage must lie within the limits defined in the technical data. Besides, the following voltage values must not be exceeded if a fault occurs (according to EN 60950): Max. DC 60 V, max. DC 120 V for 200 ms.

***Cable specification***

Only connect cables with a core cross section of a minimum of 0.25 $mm^2$ (AWG23) up to a maximum 1 $mm^2$ (AWG18) to the safety-related binary output F-DO (X31:1, X31:2) of the DFS11B option. IEC 60999 does allow clamping without conductor end sleeves. The maximum line length is 30 m.

***F-DO connection***

- The safety-related binary output is 2-pole, designed as P-M switch, and controlled via PROFIsafe by a higher-level safety control.
- An actuator must generally be connected with the safe output F-DO with a 2-pole connection between the P switch output and the M switch output (F-DO_P and F-DO_M).
- It is not permitted to make a 1-pole connection between F-DO_P and the GND reference potential as doing so would cause an error as soon as the output is controlled.
- Internal testing of the safe output is cyclical. However, when decoupling takes place, the test pulses at the connection terminals are not visible and need not be taken into account during operation.

Internal tests and monitoring processes are able to detect various external faults:

When the output is switched on, the following faults can be detected.

- Short circuit between P output and reference potential
- Short circuit between M output and +24 V supply voltage
- Short circuit between P output and M output

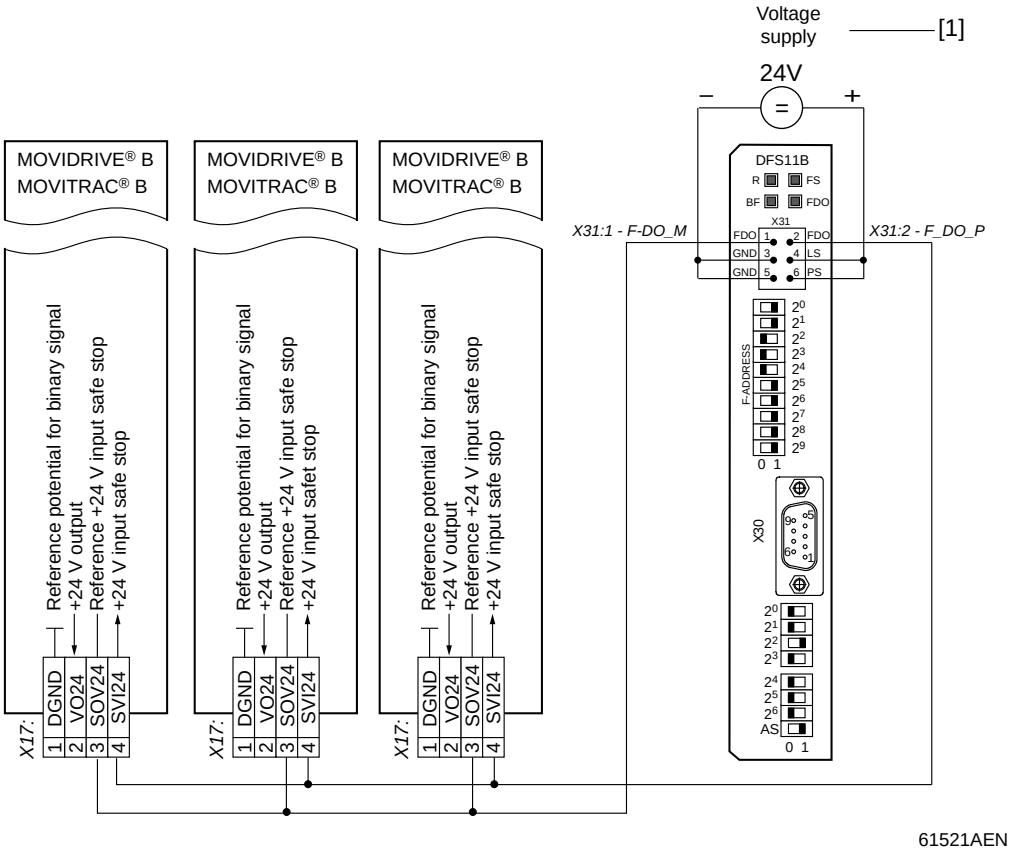
When the output is switched off, the following faults can be detected.

- Short circuit between P output and reference potential
- Short circuit between M output and reference potential
- Short circuit between P output and +24 V supply voltage
- Short circuit between M output and +24 V supply voltage

Whenever the system detects a fault, it reverts to a safe status, i.e. all safety-related process values (F-DO) are set to "0". In addition, the safety component is passivated. The fault is indicated by the "FS" LED (failsafe status) (→ page 35).

The 24 V supply voltage(s) of the DFS11B and all stations connected to the fieldbus must be designed as safety extra-low voltage. The voltage must lie within the limits defined in the technical data. In addition, the following voltage values must not be exceeded if a fault occurs (according to EN 60950): Max. DC 60 V, max. DC 120 V for 200 ms.

### 6.5.2 Group connection of MOVIDRIVE® MDX61B and MOVITRAC® B

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[1] The 24 V supply voltage(s) of the DFS11B and all stations connected to the fieldbus must be designed as safety extra-low voltage. The voltage must lie within the limits defined in the technical data. In addition, the following voltage values must not be exceeded if a fault occurs (according to EN 60950): Max. DC 60 V, max. DC 120 V for 200 ms.


Observe that the maximum current load of the F-DO safety-related binary output is DC 1 A.

The DFS11B option card might be destroyed if the maximum current load (DC 1 A) of the safety-related binary output F-DO is exceeded. If this happens, the safety function of MOVIDRIVE® MDX61B / MOVITRAC® B is not ensured.

***Cable specification***

Only connect cables with a core cross section of a minimum of 0.25 $mm^2$ (AWG23) up to a maximum 1 $mm^2$ (AWG18) to the safety-related binary output F-DO (X31:1, X31:2) of the DFS11B option. IEC 60999 does allow clamping without conductor end sleeves.

### *Power consumption of the safe contact X17 for MOVITRAC®*

**X17 safety input, terminal 4**

| Voltage / cross section / time | | Min. | Type | Max. | Unit |
|---|---|---|---|---|---|
| Safety-related 24 V supply voltage | | 19.2 | 24 | 30 | VDC |
| Power consumption (size / capacity) | Size 0 / 24 µF | – | – | 3 | Watt |
| | Size 1 / 270 µF | | | 5 | |
| | Size 2/2S / 270 µF | | | 6 | |
| | Size 3 / 270 µF | | | 7.5 | |
| | Size 4 / 270 µF | | | 8 | |
| | Size 5 / 270 µF | | | 10 | |
| Cross section of the connection line of the safety-related 24 V voltage supply | | 0.75 | – | 1.5 | $mm^2$ |
| Duration for disconnecting the safety-oriented 24 V supply voltage | Size 0 | – | – | 20 | ms |
| | Sizes 1 to 5 | | | 10 | |

### *Power consumption of the safe contact X17 for MOVIDRIVE®*

**X17 safety input, terminal 4**

| MOVIDRIVE® MDX60/61B | | General electronics data |
|---|---|---|
| Safety contact | X17:1<br>X17:2 | DGND: Reference potential for X17:3<br>VO24: $U_{OUT}$ = DC 24 V, only to supply X17:4 of the same unit; **it cannot be used** to supply other units. |
| | X17:3<br>X17:4 | SOV24: Reference potential for DC+24 V input "Safe stop" (safety contact)<br>SVI24: DC+24 V input "Safe stop" (safety contact) |
| Permitted cable cross section | | One conductor per terminal: 0.08 ... 1.5 $mm^2$ (AWG28...16)<br>Two conductors per terminal: 0.25 ... 1.0 $mm^2$ (AWG23...17) |
| Power consumption X17:4 | | Size 0: 3 W<br>Size 1: 5 W<br>Size 2, 2S: 6 W<br>Size 3: 7.5 W<br>Size 4: 8 W<br>Size 5: 10 W<br>Size 6: 6 W |
| Input capacitance X17:4 | | Size 0: 27 µF<br>Sizes 1 to 6: 270 µF |
| Time for restart<br>Time to inhibit output stage | | $t_A$ = 200 ms<br>$t_S \leq$ 100 ms |
| Signal level | | DC +19.2 V...+30 V= "1" = Contact closed<br>DC–30 V...+5 V = "0" = Contact open |

## 6.6 PROFIBUS pin assignment

Connection to the PROFIBUS network using a 9-pin D-sub plug according to IEC 61158. The T-bus connection must be made using a connector with the corresponding configuration.

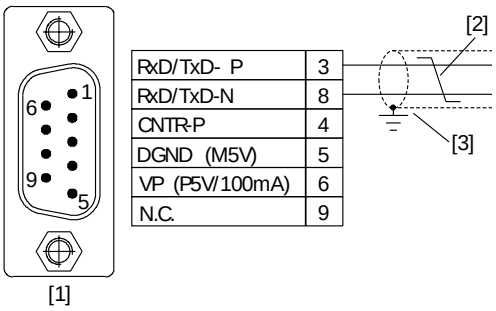



*Figure 5: Assignment of 9-pin D-sub plug to IEC 61158*

[1] 9-pin D-sub connector

[2] Signal line, twisted

[3] Conductive connection over a large area is necessary between plug housing and the shield

### 6.6.1 Connecting MOVIDRIVE® / MOVITRAC® B / PROFIBUS

As a rule, the DFS11B option is connected to the PROFIBUS system using a shielded twisted-pair cable. Observe the maximum supported transmission rate when selecting the bus connector.

The twisted-pair cable is connected to the PROFIBUS connector at pin 3 (RxD/TxD-P) and pin 8 (RxD/TxD-N). Communication takes place via these two contacts. The RS-485 signals RxD/TxD-P and RxD/TxD-N must be connected to the same contacts in all PROFIBUS stations. Otherwise, no communication is possible via the bus medium.

The PROFIBUS interface sends a TTL control signal for a repeater or fiber optic adapter (reference = pin 5) via pin 4 (CNTR-P).

### 6.6.2 Baud rates greater than 1.5 MBaud

The DFS11B option with baud rates > 1.5 MBaud can only be operated with special 12 MBaud PROFIBUS connectors.

## 6.7 Shielding and routing bus cables

The PROFIBUS interface supports RS-485 transmission technology and requires the cable type A to IEC 61158 as the physical medium for the PROFIBUS. This cable must be a shielded, twisted-pair cable.

Correct shielding of the bus cable attenuates electrical interference that may occur in industrial environments. Take the following measures to optimally shield bus cables:

- Manually tighten the mounting screws on the connectors, modules, and equipotential bonding conductors.
- Use only connectors with a metal housing or a metallized housing.
- Connect the shielding in the connector over a wide surface area.
- Apply the shielding of the bus line on both ends.
- Route signal and bus cables in separate cable ducts. Do not route them parallel to power cables (motor leads).
- Use metallic, grounded cable racks in industrial environments.
- Route the signal cable and the corresponding equipotential bonding close to each other using the shortest possible route.
- Avoid using plug connectors to extend bus cables.
- Route the bus cables closely along existing grounding surfaces.


In case of fluctuations in the ground potential, a compensating current may flow via the bilaterally connected shield that is also connected to the protective earth (PE). Make sure you supply adequate equipotential bonding according in accordance with relevant VDE regulations in such a case.

## 6.8 Bus termination

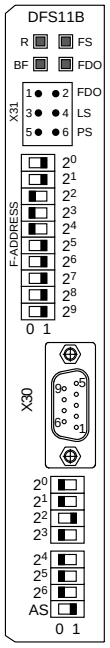
The DFS11B option is not provided with bus terminating resistors. This enables the bus system to be put into operation more easily and reduces the number of error sources.

Use a connector with integrated bus terminating resistor if the DFS11B is located at the beginning or end of a PROFIBUS segment and only one PROFIBUS cable leads to the DFS11B option.

Switch on the bus terminating resistors for this PROFIBUS connector.

## 6.9 Setting the station address

Set the PROFIBUS station address using DIP switches $2^0$ to $2^6$ on the option card. MOVIDRIVE® supports the address range 1 to 125.

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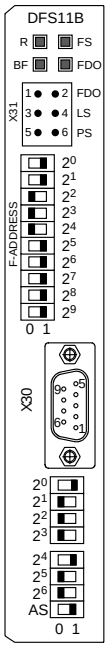
**The default setting for the PROFIBUS station address is 4:**

$2^0 \rightarrow$ Significance: $1 \times 0 = 0$
$2^1 \rightarrow$ Significance: $2 \times 0 = 0$
$2^2 \rightarrow$ Significance: $4 \times 1 = 4$
$2^3 \rightarrow$ Significance: $8 \times 0 = 0$
$2^4 \rightarrow$ Significance: $16 \times 0 = 0$
$2^5 \rightarrow$ Significance: $32 \times 0 = 0$
$2^6 \rightarrow$ Significance: $64 \times 0 = 0$

Any change made to the PROFIBUS station address during ongoing operation does not take effect immediately. The change only comes into effect when the inverter is switched on again (power supply + +24 V OFF / ON). The inverter displays the current station address in fieldbus monitor parameter P092 "Fieldbus address" (display with DBG60B or MOVITOOLS® MotionStudio / parameter tree).

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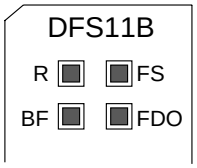
**Example: PROFIBUS station address set to 17**

$2^0 \rightarrow$ Significance: $1 \times 1 = 1$
$2^1 \rightarrow$ Significance: $2 \times 0 = 0$
$2^2 \rightarrow$ Significance: $4 \times 0 = 0$
$2^3 \rightarrow$ Significance: $8 \times 0 = 0$
$2^4 \rightarrow$ Significance: $16 \times 1 = 16$
$2^5 \rightarrow$ Significance: $32 \times 0 = 0$
$2^6 \rightarrow$ Significance: $64 \times 0 = 0$

## 6.10 Operation indicators of the DFS11B option

### 6.10.1 PROFIBUS LEDs

The PROFIBUS interface DFS11B option card has 4 LEDs that indicate the current status of the DFS11B option and the PROFIBUS system.

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***LED "R" RUN (green)***

- The **RUN** LED (green) indicates that the bus electronics are operating correctly

| RUN | Cause of error | Remedy |
|---|---|---|
| **Green** | • PROFIBUS hardware OK. | – |
| **Orange** | • The card is booting. | – |
| **Off** | • Hardware defect in the bus electronics. | • Switch the unit on again. Consult SEW service if the error occurs again. |
| **Flashes 2 Hz** | • PROFIBUS address is set higher than 125 or to 0. | • Use parameter *P093 Fieldbus Address* to check the address set with the DIP switches.<br>• Reset the inverter. |
| **Flashes 1 Hz** | • No error, only display. | • The inverter is restarting. |

***LED "BF" BUS-FAULT (red)***

- The **BUS FAULT** LED (red) indicates a PROFIBUS DP fault.

| BUS FAULT | Cause of error | Remedy |
|---|---|---|
| **Red** | • Connection to the DP master has failed.<br>• Unit does not detect PROFIBUS baud rate.<br>• Bus interruption.<br>• DP master not in operation | • Check the PROFIBUS DP connection on the unit.<br>• Check the project planning of the DP master.<br>• Check all cables in your PROFIBUS DP network. |
| **Off** | • Unit is currently exchanging data with the DP master (data exchange). | – |
| **Flashing** | • Unit has detected the baud rate, but is not addressed by DP master.<br>• Unit was not configured in DP master or configured incorrectly. | • Check the PROFIBUS address setting on the DFS11B and in the project planning software of the DP master.<br>• Check the project planning of the DP master.<br>• Use the GSD file **SEW_600C.GSD** with the identifier *MOVIDRIVE-DFS11B* or **SEW_6009.GSD** for gateway operation with MOVITRAC® B. |

***LED "FS" FAIL-SAFE STATUS (green)***

- The **FAILSAFE STATUS** LED (red) indicates the failsafe status on PROFIBUS DP.

| FS | Cause of error | Remedy |
|---|---|---|
| **Green** | • The DFS11B option is currently performing a cyclical data exchange with the F-host (data exchange).<br>• Standard operating state. | – |
| **Red** | • Fault status in the safety part.<br>• 24 V_O supply voltage is missing. | • Read diagnostic in F-host.<br>• Eliminate the cause of the fault and acknowledge in the F-host. |
| **Off** | • DFS11B option is currently in the initialization phase. | • Check voltage supply.<br>• Check configuration of the bus master. |
| **Flashing red/green** | A fault occurred in the safety part; cause of the fault already remedied acknowledgement required. | Acknowledge fault in the F-host (reintegration). |

***LED "FDO" FAIL-SAFE OUTPUT (orange)***

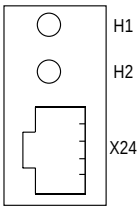
- The **FAILSAFE OUTPUT** LED (red) indicates the failsafe status on PROFIBUS DP.

| FDO | State |
|---|---|
| **Orange** | Output F-DO active |
| **Off** | Output F-DO inactive (switched off) |

**WARNING**

The "R", "BF", "FDO" and "FS" LEDs are not safety-oriented and may not be used as a safety device.

***LEDs for gateway communication status***

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| LED H1 Sys-fault (red) | Only for gateway function | |
|---|---|---|
| **Status** | **Condition** | **Description** |
| Red | System error | Gateway is not configured or one of the drives is inactive. |
| Off | SBus ok | Gateway is configured correctly. |
| Flashing | Bus scan | Bus is being checked by the gateway. |

LED **H2** H2 (green) is currently reserved.

X-terminal X24 is the RS-485 interface for diagnostics via PC and MOVITOOLS® MotionStudio.

# 7 Project Planning and Startup

This section provides you with information on project planning for the DP master and startup of the drive inverter for fieldbus operation.

Current versions of the GSD files for the DFS11B option are available on the SEW homepage under the heading "Software". Both GSD files can be used at the same time in one STEP 7 project. Once you have downloaded and unpacked the software, you will have two directories for the operating modes PROFIBUS DP and PROFIBUS DP-V1.

## *7.1 Validity of the GSD files for DFS11B*

| PROFIBUS option | MOVIDRIVE® MDX61B | MOVITRAC® B / gateway |
|---|---|---|
| **DFS11B074 firmware option 1:** | | **housing UOH11B** |
| DFS11B | SEW_600C.GSD | SEW_6009.GSD |
| | | |

Do not change or expand entries in the GSD file. SEW-EURODRIVE assumes no liability for malfunctions of the inverter caused by a modified GSD file.

## *7.2 Project planning of PROFIBUS / PROFIsafe with MOVIDRIVE® GSD file*

A GSD file is provided for project planning for the DP master. Copy this file into a special directory of your project planning software.

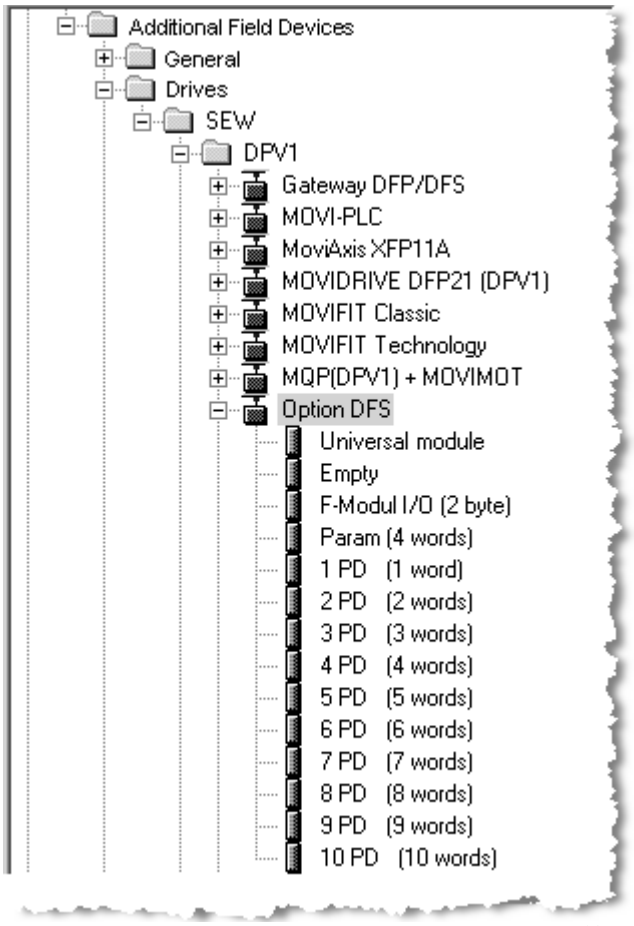
Refer to the manuals for the appropriate project planning software for details on the procedure.

### 7.2.1 GSD file for PROFIBUS DP-V1

Use the **GSD file SEW_600C.GSD** from the "DPV1" directory if you want to use the parameter setting options of DP-V1 in addition to the standard PROFIBUS DP communication to control the drive inverter.

This GSD file corresponds to GSD revision 4.

The GSD files are assigned the name for PROFIBUS DP-V1 so they are easy to identify and are displayed in a special subdirectory in the project planning software for the DP-V1 master (see following screenshot).

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### 7.2.2 Project planning procedure

Proceed as follows for project planning for MOVIDRIVE® with PROFIBUS DP interface:

1. Read the *README_GSD_600C.PDF* file that you received with the GSD file to obtain further up-to-date information on project planning.
2. Install (copy) the GSD file according to the requirements of your project planning software. Once the file has been installed correctly, the device appears next to the slave stations with the designation *MOVIDRIVE+DFS11B*.
3. Add the interface module under the name *MOVIDRIVE+DFS11B* to the PROFIBUS structure and assign the station address.
4. Select the process data configuration required for your application (see page 38).
5. Enter the I/O or peripheral addresses for the configured data widths.

After project planning, you can start PROFIBUS DP. The red **BF** LED (BUS FAULT) indicates the status of the project planning (OFF = project planning OK).

### 7.2.3 DP configurations for MOVIDRIVE® MDX61B

The drive inverter must be given a specific DP configuration by the DP master to define the type and number of input and output data used for transmission. You have the option of

- Controlling the drive using process data
- Reading and writing all drive parameters using the parameter channel
- Using a data exchange medium of your choice between IPOS plus® and the controllor.

MOVIDRIVE® drive inverters make it possible to have different DP configurations for exchanging data between the DP master and the inverter. The following table provides additional information about all possible DP configurations for the MOVIDRIVE® range. The "Process data configuration" column shows the name of the configuration. The texts will also be displayed as selection list within the project planning software for the DP master. The DP configurations column shows which configuration data is sent to the inverter when the PROFIBUS DP connection is being established.

| Process data configuration | Meaning / notes | DP Configuration | | |
|---|---|---|---|---|
| | | Slot 1 (F-module) | Slot 2 (Param-Channel) | Slot 3 (PD channel) |
| 1 PD | MOVIDRIVE® control via 1 process data word | 0x00 | 0x00 | 0xC0 0xC0 0xC0 |
| 2 PD | MOVIDRIVE® control via 2 process data words | 0x00 | 0x00 | 0xC0 0xC1 0xC1 |
| 3 PD | MOVIDRIVE® control via 3 process data words | 0x00 | 0x00 | 0xC0 0xC2 0xC2 |
| 4 PD | MOVIDRIVE® control via 4 process data words (PD4-PD10 can only be used with IPOSplus®) | 0x00 | 0x00 | 0xC0 0xC3 0xC3 |
| 5 PD | MOVIDRIVE® control via 5 process data words (PD4-PD10 can only be used with IPOSplus®) | 0x00 | 0x00 | 0xC0 0xC4 0xC4 |
| 6 PD | MOVIDRIVE® control via 6 process data words (PD4-PD10 can only be used with IPOSplus®) | 0x00 | 0x00 | 0xC0 0xC5 0xC5 |
| 7 PD | MOVIDRIVE® control via 7 process data words (PD4-PD10 can only be used with IPOSplus®) | 0x00 | 0x00 | 0xC0 0xC6 0xC6 |
| 8 PD | MOVIDRIVE® control via 8 process data words (PD4-PD10 can only be used with IPOSplus®) | 0x00 | 0x00 | 0xC0 0xC7 0xC7 |
| 9 PD | MOVIDRIVE® control via 9 process data words (PD4-PD10 can only be used with IPOSplus®) | 0x00 | 0x00 | 0xC0 0xC8 0xC8 |
| 10 PD | MOVIDRIVE® control via 10 process data words (PD4-PD10 can only be used with IPOSplus®) | 0x00 | 0x00 | 0xC0 0xC9 0xC9 |
| Param + 1 PD | MOVIDRIVE® control via 1 process data word Parameter setting via 8 byte parameter channel | 0x00 | 0xC0 0x87 0x87 | 0xC0 0xC0 0xC0 |
| Param + 2 PD | MOVIDRIVE® control via 2 process data words Parameter setting via 8 byte parameter channel | 0x00 | 0xC0 0x87 0x87 | 0xC0 0xC1 0xC1 |
| Param + 3 PD | MOVIDRIVE® control via 3 process data words Parameter setting via 8 byte parameter channel | 0x00 | 0xC0 0x87 0x87 | 0xC0 0xC2 0xC2 |
| Param + 4 PD | MOVIDRIVE® control via 4 process data words Parameter setting via 8 byte parameter channel | 0x00 | 0xC0 0x87 0x87 | 0xC0 0xC3 0xC3 |
| Param + 5 PD | MOVIDRIVE® control via 5 process data words Parameter setting via 8 byte parameter channel | 0x00 | 0xC0 0x87 0x87 | 0xC0 0xC4 0xC4 |
| Param + 6 PD | MOVIDRIVE® control via 6 process data words Parameter setting via 8 byte parameter channel (PD4-PD10 can only be used with IPOSplus®) | 0x00 | 0xC0 0x87 0x87 | 0xC0 0xC5 0xC5 |
| Param + 7 PD | MOVIDRIVE® control via 7 process data words Parameter setting via 8 byte parameter channel | 0x00 | 0xC0 0x87 0x87 | 0xC0 0xC6 0xC6 |
| Param + 8 PD | MOVIDRIVE® control via 8 process data words Parameter setting via 8 byte parameter channel | 0x00 | 0xC0 0x87 0x87 | 0xC0 0xC7 0xC7 |

| Process data configuration | Meaning / notes | DP Configuration | | |
|---|---|---|---|---|
| | | Slot 1 (F-module) | Slot 2 (Param-Channel) | Slot 3 (PD channel) |
| Param + 9 PD | MOVIDRIVE® control via 9 process data words<br>Parameter setting via 8 byte parameter channel | 0x00 | 0xC0 0x87 0x87 | 0xC0 0xC8 0xC8 |
| Param + 10 PD | MOVIDRIVE® control via 10 process data words<br>Parameter setting via 8 byte parameter channel<br>(PD4-PD10 can only be used with IPOS$^{plus®}$) | 0x00 | 0xC0 0x87 0x87 | 0xC0 0xC9 0xC9 |

***Universal DP configuration***

If you select the "Universal Module" DP configuration (S7 HWConfig), you can structure the DP configuration individually, although the following conditions must be complied with:

**Module 0 (DP identifier 0) defines the F-PD module.**

Can only be configured via the master software because CRC32 must be calculated by means of the settings made.

**Module 1 (DP identifier 1) defines the parameter channel of the inverter.**

To ensure the parameter settings are made correctly, you must always transfer the parameter channel consistently for the entire length.

| Length | Function |
|---|---|
| 0 | Parameter channel deactivated |
| 8 I/O bytes | Parameter channel is used |

**Module 2 (DP identifier 2) defines the process data channel of the inverter.**

In addition to the process data configuration predefined in the GSD file, you can also specify process data configuration with 4, 5, 7, 8 and 9 process data words. Ensure that the number of input and output words is always the same. If the lengths are different, data cannot be exchanged. In this case, the **BUS FAULT** LED flashes; the parameter **P090 PD Configuration** indicates the configuration error with *0PD*.

| Length | Function |
|---|---|
| 2 I/O bytes or 1 I/O word | 1 process data word |
| 4 I/O bytes or 2 I/O words | 2 process data words |
| 6 I/O bytes or 3 I/O words | 3 process data words |
| 8 I/O bytes or 4 I/O words | 4 process data words |
| 10 I/O bytes or 5 I/O words | 5 process data words |
| 12 I/O bytes or 6 I/O words | 6 process data words |
| 14 I/O bytes or 7 I/O words | 7 process data words |
| 16 I/O bytes or 8 I/O words | 8 process data words |
| 18 I/O bytes or 9 I/O words | 9 process data words |
| 20 I/O bytes or 10 I/O words | 10 process data words |

**Note:**

DFS11B does not support the "Compact identifier formats" coding.

Only use the setting "Integrity over entire length" for data transmission.

***Data consistency***

Consistent data is data that has to be transmitted between the programmable controller and the drive inverter as one block at all times and must never be transmitted separately.

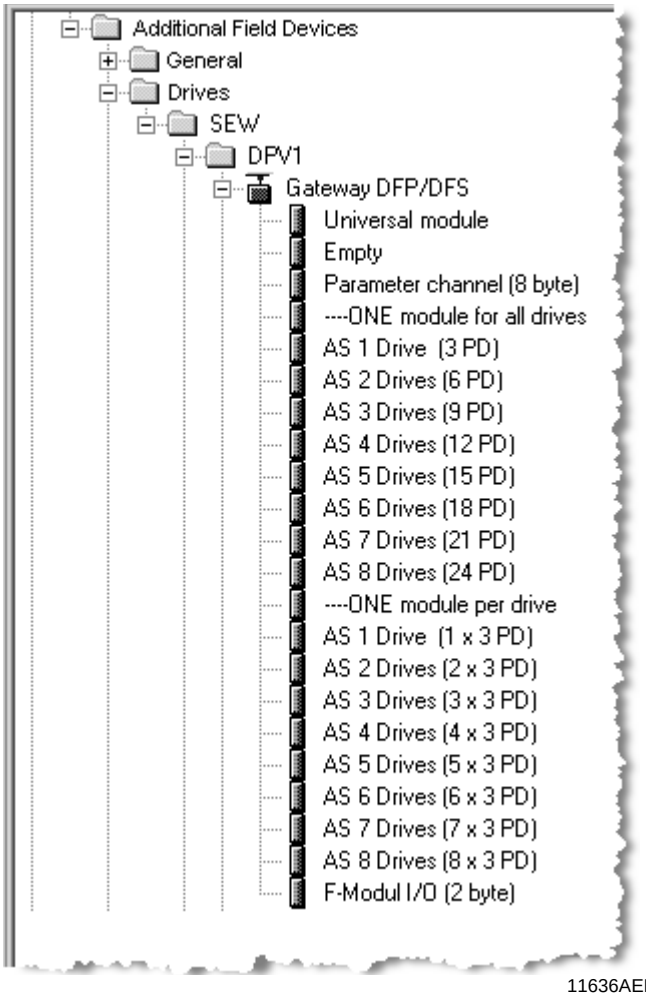
Data integrity is especially important for the transmission of positioning values or complete positioning tasks. Inconsistent transmission may contain data from different program cycles of the automation device. This would lead to undefined values being transmitted to the drive inverter.

For PROFIBUS DP, data communication between the programmable controller and drive engineering devices is usually carried out with the setting "Data integrity over entire length".

## 7.3 Project planning for DP master with MOVITRAC® or gateway GSD file

This section provides information on project planning for the PROFIBUS DP master with MOVITRAC® B and DFS11B gateway / UOH11B.

### 7.3.1 GSD file for operation in MOVITRAC® B and UOH11B gateway housing

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Use the GSD file SEW_6009.GSD from the "DPV1" directory if you want to use the DFS11B as gateway from PROFIBUS DP-V1 on the SBus to control the drive inverter.

This GSD file corresponds to GSD revision 5.

Refer to the manuals for the appropriate project planning software for details on the procedure.

The unit master data files standardized by the PROFIBUS user organization can be read by all PROFIBUS DP masters.

| Project planning tool | DP master | File name |
|---|---|---|
| All DP project planning tools to EN 50170 (V2) | for DP master standard | SEW_6009.GSD |
| Siemens S7 hardware configuration | for all S7 DP masters | |

### 7.3.2 PROFIBUS DP master startup

Supporting files for DFS11B gateway are available in the Internet at SEW Eurodrive website.

- Install the GSD file according to the requirements of the project planning software for the DP master. After successful installation, the "DFS11B gateway" device appears in the list of slave stations.
- Insert the fieldbus interface into the PROFIBUS structure under the name "DFS11B gateway" and assign the PROFIBUS address.
- Select the process data configuration required for your application (see the section "Configuring the PROFIBUS DP interface" on page 43).
- Enter the I/O and / or peripheral addresses for the configured data widths.
- Save the configuration.
- Expand your application program by the data exchange with the fieldbus interface. For S7, use the system functions for consistent data exchange for this purpose (SFC14 and SFC15).
- The **BUS FAULT** LED at the fieldbus interface should extinguish after you have saved the project, loaded it in the DP master and started the DP master. If this is not the case, check the connections and terminating resistors of the PROFIBUS and the configuration, especially the PROFIBUS address.

### 7.3.3 Configuring the PROFIBUS DP interface

***General information***

The inverter must be given a specific DP configuration by the DP master to define type and number of input and output data used for the transmission. You have the opportunity to control the drives via process data and to read and write all parameters of the fieldbus interface via the parameter channel.

The figure shows a schematic view of the data exchange between automation device (DP-V1 master), fieldbus interface (DP-V1 slave) and an inverter with process data channel and parameter channel.

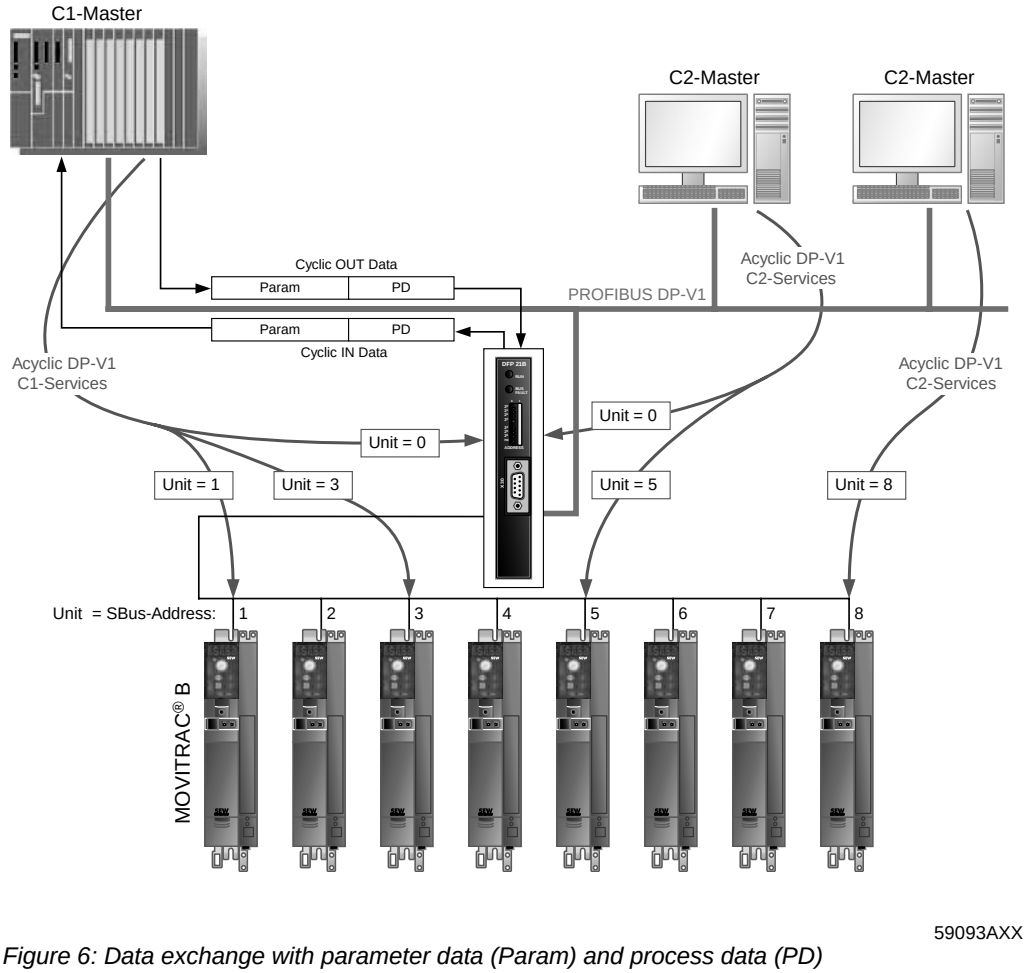


*Figure 6: Data exchange with parameter data (Param) and process data (PD)*

***Configuring the process data***

The fieldbus interface allows for different DP configurations in the data exchange between DP master and fieldbus interface. The following table provides additional details on all standard DP configurations of the fieldbus interfaces. The "Process data configuration" column shows the name of the configuration. The texts will also be displayed as selection list within the project planning software for the DP master. The DP configurations column shows the type of configuration data sent to the fieldbus interface while the link to PROFIBUS DP is being established. The configurations are determined by the default process data width for SEW inverters of three process data words. The fieldbus interface then distributes these process data words to the individual devices. The parameter channel is used for setting the parameters of the DFS11B option and is not passed on to the connected stations. The fieldbus interface accepts between 1 to 24 process data words with and without parameter channel.

The standard entries of the GSD file are based on the DFS11B Autosetup operating mode and allow process data widths of 3 PD... 24 PD corresponding to 1 ... 8 inverters connected to the fieldbus interface.


**3 PDs are always assigned to any SBus station.**

*One module for all drives*

The process data are transmitted in **one** consistent data block for all inverters connected to the fieldbus interface. Thus, only system functions SFC14 and SFC15 need to be called in STEP 7.

*One module per drive*

One consistent data block exists for each connected inverter. From the controller side, this corresponds to the existing setup of several inverters with their own fieldbus interface. System functions SFC14 and SFC15 need to be called for each inverter in STEP 7.


Drive parameters of connected MOVITRAC® B inverters can only be accessed using the DP-V1 parameter services.

| Process data configuration | Description | Slot 1<br>F-PD module | Slot 2<br>Parameter channel | Slot 3<br>Drive 1 | Slot 4<br>Drive 2 | Slot 5<br>Drive 3 | Slot 6<br>Drive 4 | Slot 7<br>Drive 5 | Slot 8<br>Drive 6 | Slot 9<br>Drive 7 | Slot 10<br>Drive 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ONE module for all drives** | | | | | | | | | | | |
| Param | 8 byte parameter channel | 00hex | C0hex, 87hex, 87hex | | | | | | | | |
| AS 1 drive (3 PD) | Control via 3 PD | 00hex | | C0hex, C2hex, C2hex | | | | | | | |
| AS 2 drives (6 PD) | Control via 6 PD | 00hex | | C0hex, C5hex, C5hex | | | | | | | |
| AS 3 drives (9 PD) | Control via 9 PD | 00hex | | C0hex, C8hex, C8hex | | | | | | | |
| AS 4 drives (12 PD) | Control via 12 PD | 00hex | | C0hex, CBhex, CBhex | | | | | | | |
| AS 5 drives (15 PD) | Control via 15 PD | 00hex | | C0hex, CEhex, CEhex | | | | | | | |
| AS 6 drives (18 PD) | Control via 18 PD | 00hex | | C0hex, D1hex, D1hex | | | | | | | |
| AS 7 drives (21 PD) | Control via 21 PD | 00hex | | C0hex, D4hex, D4hex | | | | | | | |
| AS 8 drives (24 PD) | Control via 24 PD | 00hex | | C0hex, D7hex, D7hex | | | | | | | |
| **ONE module per drive** | | | | | | | | | | | |
| Param | 8 byte parameter channel | 00hex | C0hex, 87hex, 87hex | | | | | | | | |
| AS 1 drive (1 x 3 PD) | Control via 1 x 3 PD | 00hex | | C0hex, C2hex, C2hex | | | | | | | |
| AS 2 drives (2 x 3 PD) | Control via 2 x 3 PD | 00hex | | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | | | | | | |
| AS 3 drives (3 x 3 PD) | Control via 3 x 3 PD | 00hex | | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | | | | | |
| AS 4 drives (4 x 3 PD) | Control via 4 x 3 PD | 00hex | | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | | | | |
| AS 5 drives (5 x 3 PD) | Control via 5 x 3 PD | 00hex | | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | | | |
| AS 6 drives (6 x 3 PD) | Control via 6 x 3 PD | 00hex | | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | | |
| AS 7 drives (7 x 3 PD) | Control via 7 x 3 PD | 00hex | | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | |
| AS 8 drives (8 x 3 PD) | Control via 8 x 3 PD | 00hex | | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex | C0hex, C2hex, C2hex |

*"Universal module" DP configuration*

The "Universal Module" (e.g. in STEP7) lets you to set the parameters of the fieldbus interface deviating from the preset default values of the GSD file. This is useful, for example, if you want to operate several inverters with different process data words at the fieldbus interface.

Observe the following conditions:

- Module 1 defines the parameter channel of the inverter. Entering 0 switches off the parameter channel. Entering the value 0xC0 0x87 0x87 will activate the parameter channel with 8 bytes length.
- The following modules determine the process data length of the fieldbus interface at the PROFIBUS. The total process data length of all following modules must be between 1 and 24 words. For safety reasons, the modules must be listed with data integrity. Ensure that an inverter connected to the fieldbus interface is represented by such a consistent module entry.
- Only the compact identifier format is permitted.

### 7.3.4 Operating mode (DP-V1 mode)

The DP-V1 operating mode can usually be activated during project planning for a C1 master. All DP slaves, which have the DP-V1 functions enabled in their GSD files and which support DP-V1, will then be operated in DP-V1 mode. Standard DP slaves will still run via PROFIBUS DP. This ensures mixed mode for DP-V1 and DP-capable modules. Depending on the master functionality, a DP-V1 capable station, that was configured using the DP-V1 GSD file, can run in the "DP" operating mode.

### 7.3.5 Auto setup for gateway operation

The auto setup function lets you start up the DFS11B as gateway without a PC. It is activated via the auto setup DIP switch (see section "Assembling and installing the UOH11B gateway" on page 25).

Switching on the Auto setup DIP switch causes the function to be performed once. **The Auto setup DIP switch must then remain in the ON position.** The function can be reactivated by turning the DIP switch off and back on again.

As a first step, the DFS11B searches for drive inverters on the SBus below its hierarchical level. This process is indicated by the **H1** LED (system error) flashing briefly. For this purpose, different SBus addresses must be set for the drive inverters (P813). SEW-EURODRIVE recommends assigning the addresses beginning with address 1 in ascending order based on the arrangement of inverters in the control cabinet. The process image on the fieldbus side is expanded by three words for each detected drive inverter.

The **H1** LED remains lit if no drive inverter was detected. A total of up to eight drive inverters is taken into account. The following figure shows the process image for three drive inverters with three words each of process output data and process input data.

After the search is completed, the DFS11B periodically exchanges three process data words with each connected drive inverter. The process output data are fetched from the fieldbus, divided into blocks of three and transmitted. The drive inverters read the process input data, put them together and send them to the fieldbus master.

The cycle time of the SBus communication requires 2 ms for each station.

For an application with 8 inverters on the SBus, the cycle time of the process data update is then 8 x 2 ms = 16 ms.

The DFS11B option saves the process data once during auto setup. This is the reason why you have to activate Auto setup again if you change the process data assignment of the drive inverters connected to the DFS11B option. At the same time, the process data assignments of the connected drive inverters may not be changed dynamically after Auto setup.

The following figure shows the data exchange between DP-V1 master, DFS and inverter.

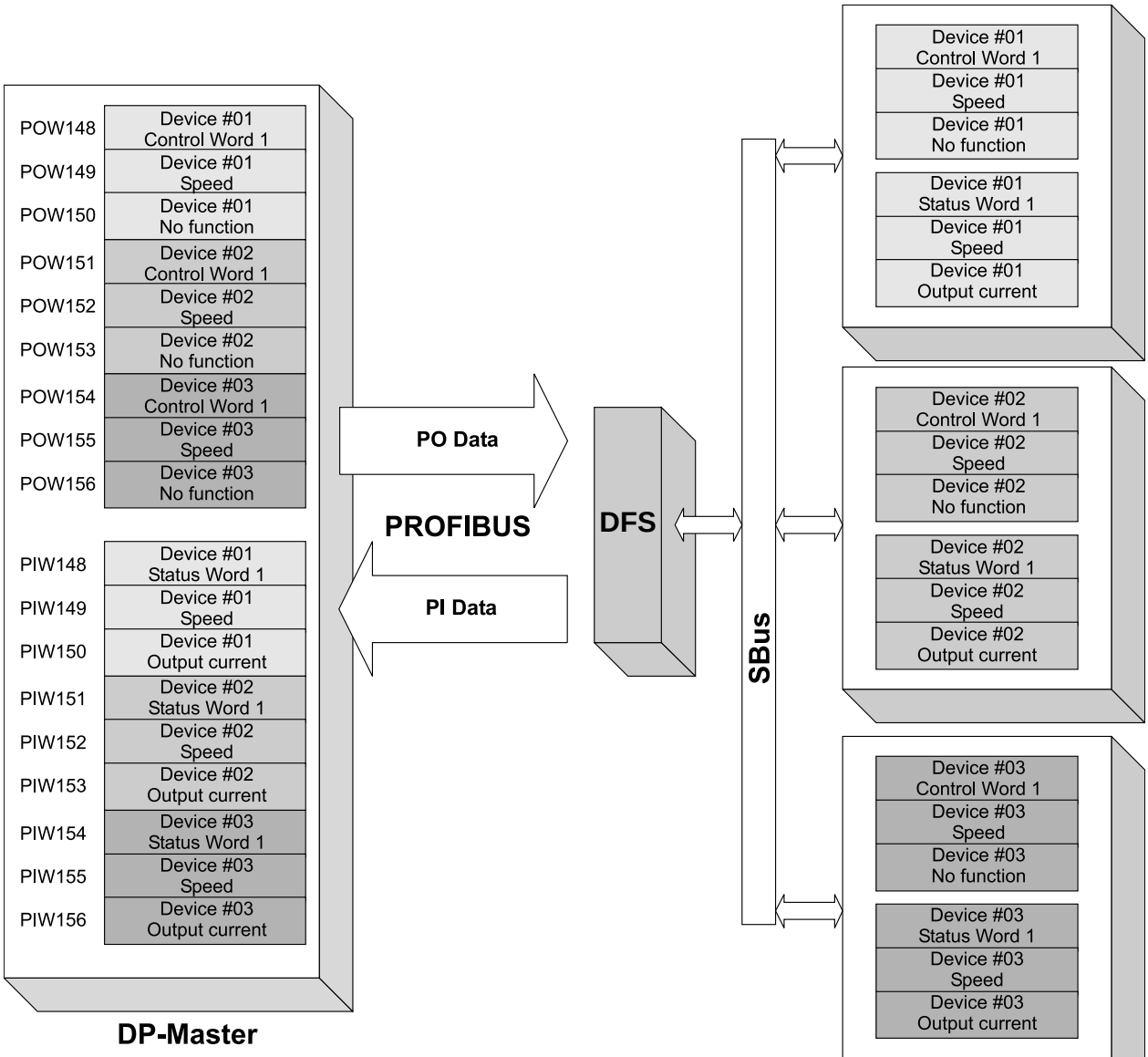


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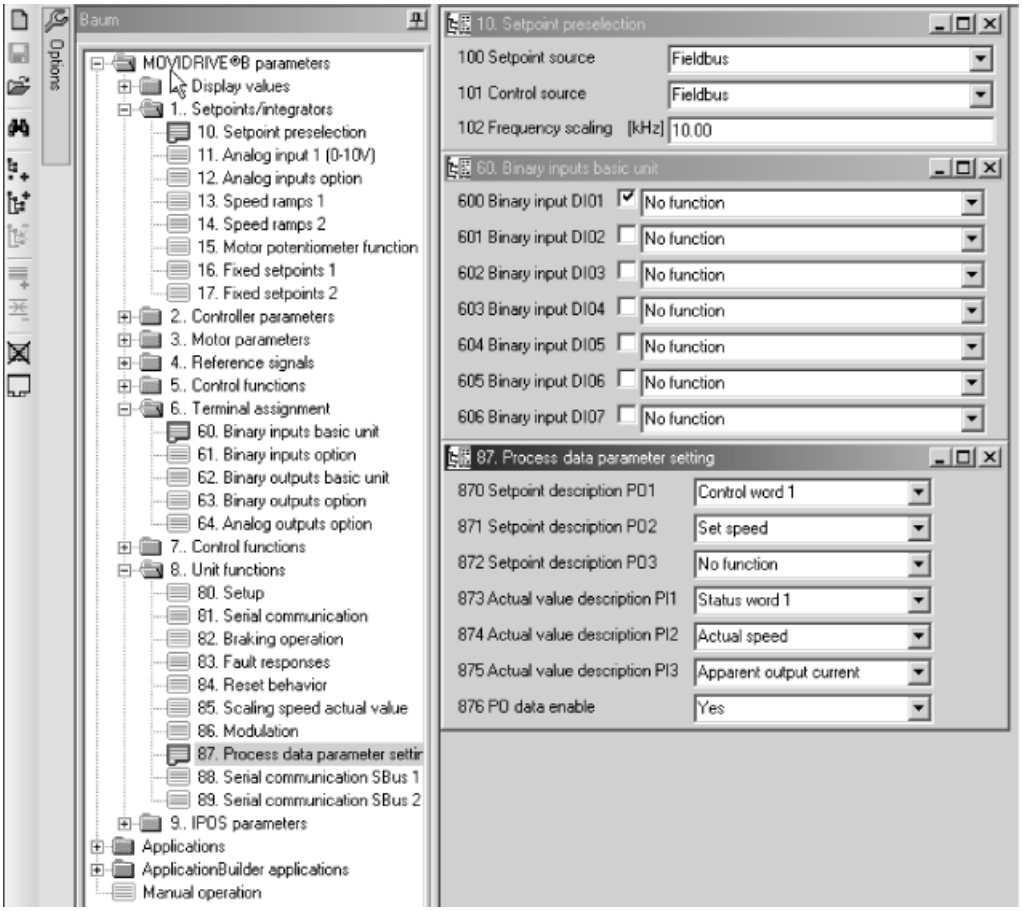
*Figure 7: Data exchange DP-V1 master – UFP – inverter*

## 7.4 Setting the MOVIDRIVE® MDX61B drive inverter

The following settings are required for simple fieldbus operation.

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However, to control the MOVIDRIVE® MDX61B drive inverter via PROFIBUS, you must first switch the drive inverter to control signal source (P101) and setpoint source (P100) = FIELDBUS. The FIELDBUS setting means the drive inverter parameters are set for control and setpoint entry via PROFIBUS. The MOVIDRIVE® MDX61B drive inverter then responds to the process output data transmitted from the master programmable controller.

The parameters of the MOVIDRIVE® MDX61B drive inverter can be set straight away via PROFIBUS without any further settings once the PROFIBUS option card has been installed. For example, all parameters can be set by the master programmable controller after power-on.

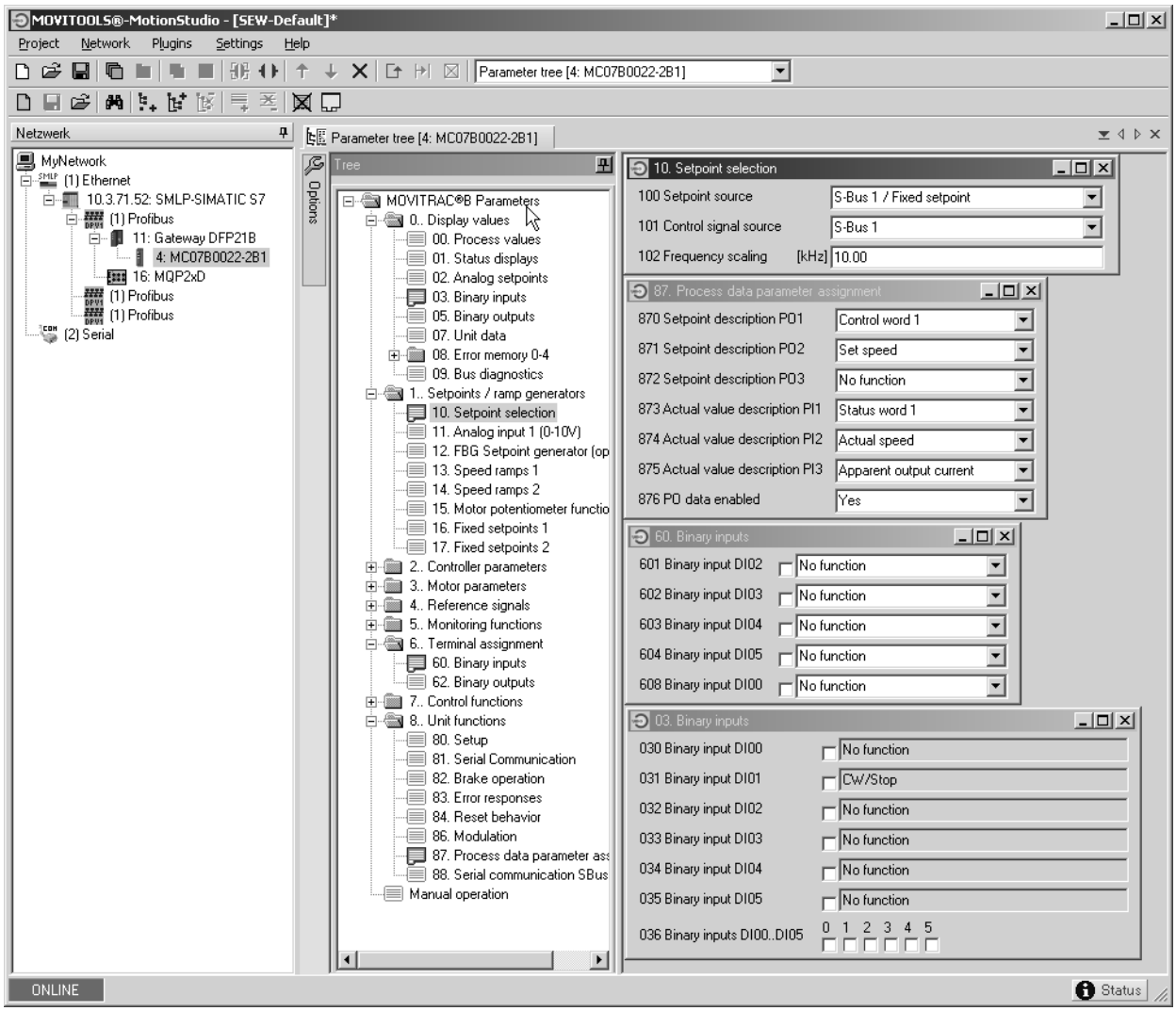
Activation of the control signal source and setpoint source FIELDBUS is signaled to the machine controller using the "Fieldbus mode active" bit in the status word.

For safety reasons, you must also enable the MOVIDRIVE® MDX61B drive inverter at the terminals for control via the fieldbus system. Therefore, you must wire and program the terminals in such a way that the inverter is enabled via the input terminals. For example, the simplest way of enabling the drive inverter at the terminals is to connect the DIØØ (function / CONTROL INHIBIT) input terminal to a +24 V signal and to program input terminals DIØ1 ... DIØ3 to NO FUNCTION.

The procedure for startup of the MOVIDRIVE® MDX61B drive inverter with a fieldbus connection is described on the next page.

## 7.5 Setting the MOVITRAC® B frequency inverter

The following settings are required for simple fieldbus operation.

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To control the inverter via PROFIBUS, you first have to switch the drive inverter to *control signal source (P101)* and *setpoint source (P100)* = SBus. The SBus setting means the inverter parameters are set for control and setpoint entry via gateway. The MOVITRAC® frequency inverter then responds to the process output data transmitted from the master programmable controller.

It is necessary to set the SBus1 timeout interval (P815) to a value other than 0 ms for the MOVITRAC® B frequency inverter to stop in the event of a faulty SBus communication. SEW-EURODRIVE recommends a value in the range between 50 and 200 ms.

Activation of the control signal source and setpoint source SBus is signaled to the higher-level controller using the "SBus mode active" bit in the status word.

For safety reasons, you must also enable the inverter at the terminals for control via the fieldbus system. Therefore, you must wire and program the terminals in such a way that the inverter is enabled via the input terminals. The simplest way of enabling the inverter at the terminals is, for example, to connect the DIØ1 (function CW/STOP) input terminal to a +24 V signal and to program the remaining input terminals to NO FUNCTION.

Set the parameter *P881 SBus address* to values between 1 and 8 in ascending order.

The SBus address 0 is used by the DFS11B gateway and must therefore not be used.

## 7.6 Project planning of PROFIsafe with STEP7

Configure the fail-safe DFS fieldbus interface as usual under STEP7 HW Config for PROFIBUS-DP operation.

To ensure fault-free DFS operation with PROFIsafe, you must obtain the optional package entitled "Distributed Safety (V5.4 or later)" for configuring and setting the parameters of the module under STEP7.

### 7.6.1 Hardware structure

- Wire the PROFIBUS line structure
- Set the PROFIBUS and fail-safe addresses:
  - Set the PROFIsafe address on the DFS (factory setting: address 255). Set the PROFIsafe address using the DIP switch. You may set an address ranging from 1 to 1022.
  - Ensure that the setting on the DFS matches the PROFIsafe address in STEP7 HW Config.
    The following figure shows the DIP switch setting for address 1012 in the example.

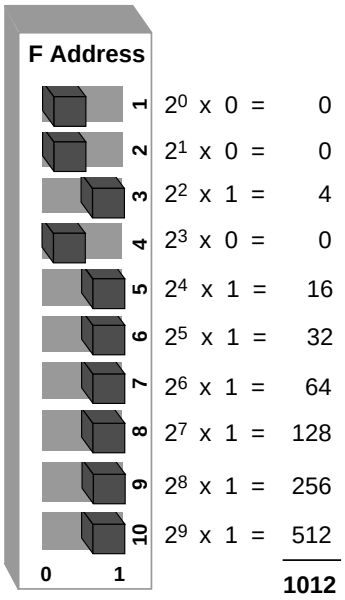


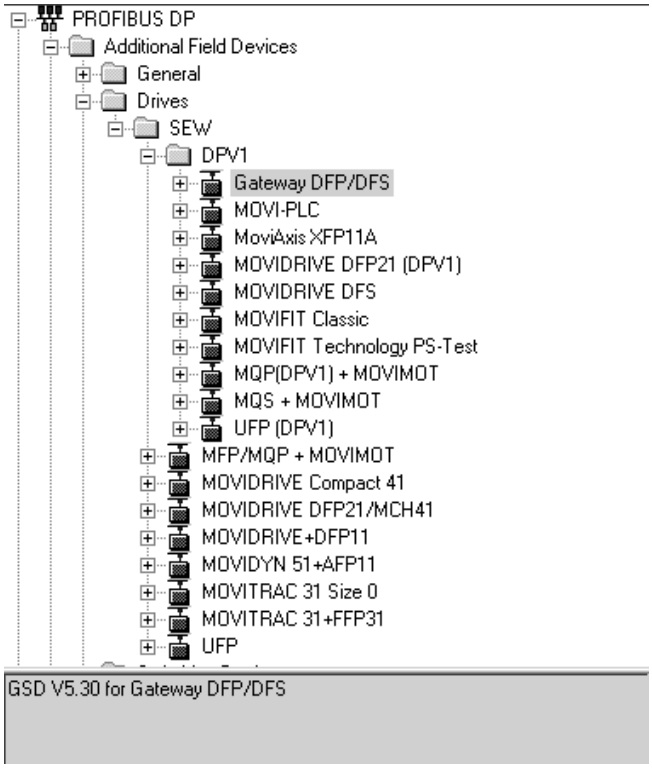

*Figure 8: Addressing example using address 1012*

### 7.6.2 Installing the GSD file

Use the following GSD and image files for the DFS option card with PROFIsafe functionality:

| PROFIBUS option DFS11B074 firmware option 1: | MOVIDRIVE® MDX61B | MOVITRAC® B / gateway housing UOH11B |
|---|---|---|
| DFS11B | SEW_600C.GSD | SEW_6009.GSD |

Once you have installed the GSD file, the module appears in the Hardware catalog of STEP7 / HW Config under:

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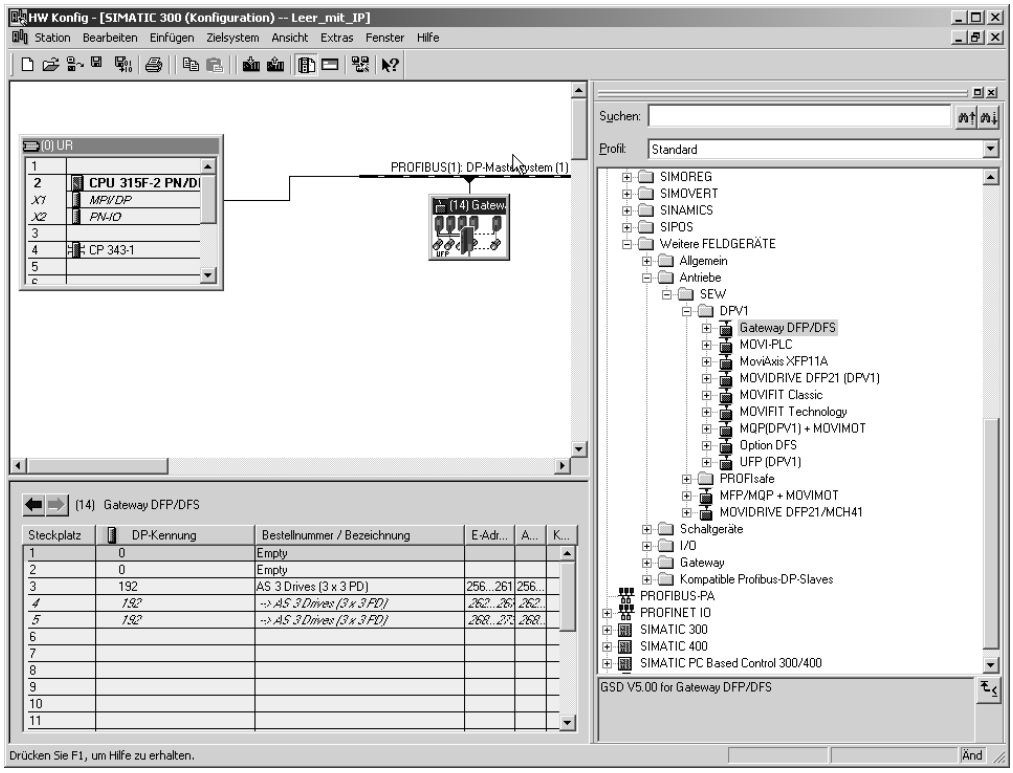
### 7.6.3 Configuring the DFS in HW Config

In HW Config, drag and drop the device entry "Gateway DFP/DFS" or "MOVIDRIVE DFS11B" to the bus cable.

If slot 1 is not configured, you can operate the DFS like the standard fieldbus module. No safety function via PROFIsafe is available in this configuration.

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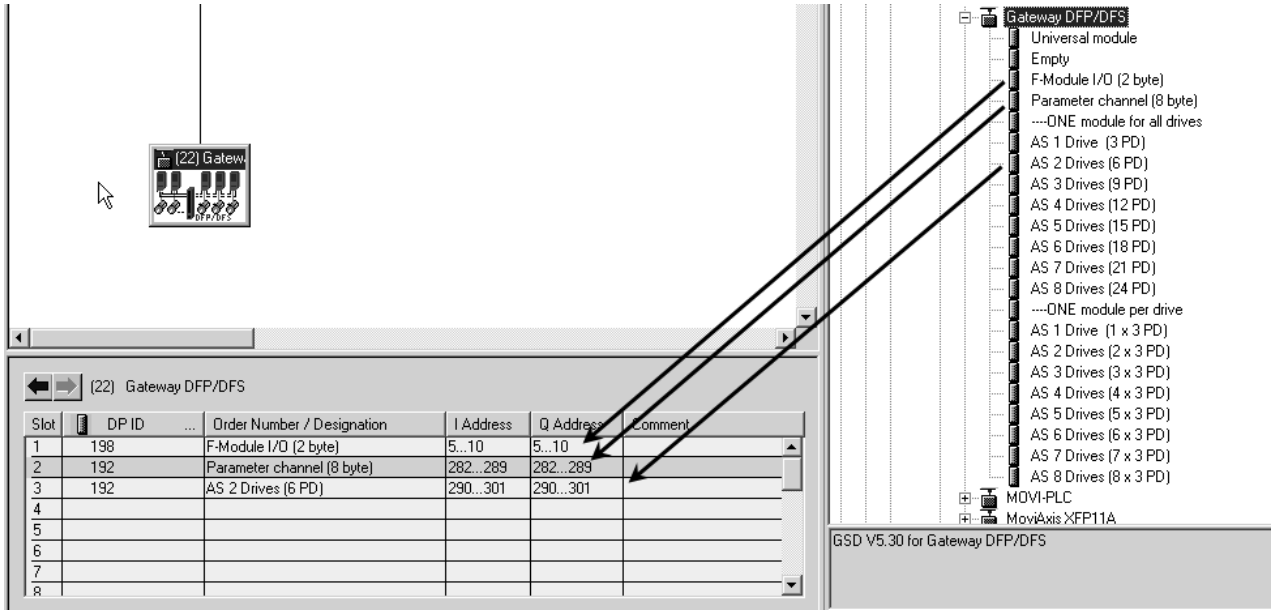
### 7.6.4 Project planning for a new configuration

You will usually have to adjust the project planning in HW Config to your specific application. To do so, assign the relevant modules to slots 1 to 3. Each slot has a specific function assigned to it. The function of the slot will be displayed in the "DP identifier" column after you have deleted the default configuration of slots 1 to 3. The following table gives an overview of the slot functionality.

| Slot | DP identifier | Description of the function |
|---|---|---|
| 1 | F channel | The PROFIsafe® channel is configured in slot 1. It can be assigned the following modules:<br>• "F-module I/O (2-byte)" = PROFIsafe® channel is used for DFS11B option<br>• "F-module I/O (8-byte)" = PROFIsafe® channel is used for DFS11B option<br>• "Empty" = PROFIsafe channel is not used<br><br>**IMPORTANT**<br>If no PROFIsafe channel is configured, the safety-oriented part of the DFS option remains in safe condition and the safe output FDO0 remains disabled. |
| 2 | Parameter channel | The 8-byte parameter channel is configured in slot 2 if you want to reach parameters of the DFS option via the cyclical PROFIBU DP data. **This channel is not safety-oriented** and can be assigned with the following modules:<br>• "Param (4 words)" = Parameter channel is used<br>• "Empty" = Parameter channel is not used |
| 3 | PD channel | The process data for controlling MOVIDRIVE® / MOVITRAC® are configured in slot 3. Always the same number of process data is transmitted in direction of the input and output. The process data channel must always be configured. **This channel is not safety-oriented**. See section 7.2 on page 36 and section 7.3 on page 41. |

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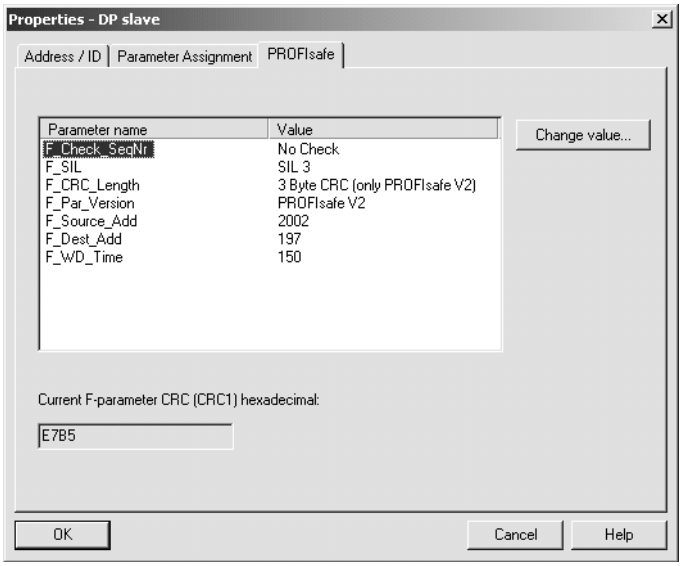
### 7.6.5 Setting the parameters of the PROFIsafe properties

Set the parameters of the PROFIsafe properties of the fail-safe DFS in STEP7 HW Config by double-clicking the configured F-module in slot 1. The [DP slave properties] window opens with the tab pages [Adress/identifier], [Set parameters] and [PROFIsafe].

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The *F_Dest_Add* parameter displays the PROFIsafe address that was previously set using the F-address DIP switch of the DFS module.

### 7.6.6 Description of the F-parameters

When the PROFIBUS DP starts up, the PROFIBUS DP master sends the safety-relevant parameters for PROFIsafe operation in an F parameter block to the DFS option. The parameters will then be checked for plausibility in the safety-oriented part of the DFS. The DFS does not start data exchange on PROFIBUS DP until this F parameter block is acknowledged positively.

Below is a list of the safety-oriented parameters which are passed on to the DFS option. You can set the following parameters for your safety application:

- *F_CRC_Length*
- *F_Par_Version*
- *F_Dest_Add*
- *F_WD_Time*

***Parameter "F_Check_SeqNr " (fix)***

This parameter determines whether the Ready counter (consecutive number) is to be included in the consistency check (CRC calculation) of the F user data telegram.

The DFS option supports the following setting:

- F_Check_SeqNr = "No check"

***Parameter "F_SIL" (fix)***

This parameter enables F stations to check if the safety category matches that of the F-Host. Depending on the risk, different safety circuits with different safety classes SIL 1 to SIL 3 (SIL = Safety Integrity Level), apply in these safety-relevant cases.

The DFS option supports the following setting:

- *F_SIL = SIL 3*

***Parameter "F_CRC_Length" (can be set)***

Depending on the length of the F user data (process values) and the PROFIsafe version, the length of the required CRC check value varies. This parameter communicates the anticipated length of the CRC2 key in the safety telegram to the F component.

The DFS option handles user data that is less than 12 bytes in length, so that with PROFIsafe V1, a 2 byte CRC is used and with PROFIsafe V2, a 3 byte CRC is used.

The DFS option supports the following setting:

- *F_CRC_Length* = 2 byte CRC (only with PROFIsafe® V1)
  3 byte CRC (only with PROFIsafe® V2)

***Parameter "F_Par_Version" (can be set)***

This parameter identifies the PROFIsafe version implemented in the DFS option. You can choose between PROFIsafe® V1 and PROFIsafe V2®. DFS supports both versions.

***Parameter "F_Source_Add" (fix)***

The PROFIsafe addresses are used for unique identification of the source (*F_Source_Add*) and destination (*F_Dest_Add*). The combination of source and destination address must be unique throughout the network and station. The source address *F_Source_Add* is automatically provided by STEP7 depending on the master configuration.

Values ranging from 1 to 65534 can be entered in parameter "*F_Source_Add*".

You cannot directly edit this parameter in STEP7 HW Config.

***Parameter "F_Dest_Add" (can be set)***

The PROFIsafe address you have set using the F-address DIP switch on the DFS module is displayed on this parameter.

Values ranging from 1 to 1023 can be entered in parameter "*F_Dest_Add*".

***Parameter "F_WD_Time" (can be set)***

This parameter defines a monitoring time in the fail-safe part of the DFS option.

During this monitoring period, an up-to-date safety telegram must arrive from the F-CPU. Otherwise the DFS option reverts to safe status.

Select a monitoring time of a sufficient length so that communication can tolerate message delays, but also sufficiently short enough for your safety application to run without restriction.

For the DFS option, you can define the "*F_WD_Time*" parameter in steps from 1 ms to 10 s.

### 7.6.7 Safety diagnostics using PROFIBUS DP

The status of PROFIsafe communication and DFS11B option error messages is transmitted to the DP master via a status PDU in accordance with the PROFIBUS DPV1 standard.

The following figure shows how the diagnostic data is organized for PROFIsafe communication via slot 1. The F-PD module for the DFS11B option is configured in slot 1.

Byte 11 is used for transmitting diagnostic messages. These are defined in the PROFIsafe specifications.

Bytes 12 and 13 transmit the status and fault status of the DFS11B option to the higher-level DP master.

The figure below shows the structure of diagnostic data for PROFIBUS DPV1:

| | **Status block** | | | | | | |
|---|---|---|---|---|---|---|---|
| Bytes 1...6 | Byte 7 | Byte 8 | Byte 9 | Byte 10 | Byte 11 | Byte 12 | Byte 13 |
| 6 bytes Standard diagnostics | **Header** | **Status Type** | **Slot Number** | **Status Specifier** | **Diag User Data 0** | **Diag User Data 1** | **Diag User Data 2** |
| ... | 0x07 | 0x81 | 0x00 | 0x00 | PROFIsafe | F-State 1 | |
| | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ | |
| | 7 bytes module-specific diagnostics | 0x81 = Status block with status message | 0x00 = Slot 1 (PROFIsafe® option) | No DPV1 specifier | PROFIsafe diagnostic information in accordance with PROFIsafe profile V2.0 | Cyclical F_State of the DFS11B option | |

***Diagnostic messages of the PROFIsafe layer***

The table below shows the diagnostic messages of the PROFIsafe layer:

| Byte 11 | PROFIBUS diagnostic message (German) | PROFIBUS diagnostic message (English) |
|---|---|---|
| **0hex / 0dec** | Kein Fehler | --- |
| **40hex / 64dec** | F_Dest_Add stimmt nicht überein | Mismatch of F_Dest_Add |
| **41hex / 65dec** | F_Dest_Add ist ungültig | F_Dest_Add not valid |
| **42hex / 66dec** | F_Source_Add ist ungültig | F_Source_Add not valid |
| **43hex / 67dec** | F_WD_Time ist 0 ms | F_WD_Time is 0 ms |
| **44hex / 68dec** | F_SIL Level größer max SIL Level | F_SIL exceeds SIL f. application |
| **45hex / 69dec** | Falsche F_CRC_Length | F_CRC_Length does not match |
| **46hex / 70dec** | Falsche F-Parameter Version | F parameter incorrectly set |
| **47hex / 71dec** | Fehler im CRC1-Wert | CRC1 fault |

For more information on the meaning of fault messages and troubleshooting procedures refer to the PROFIBUS-DP master manuals.

***Fault codes of the DFS11B option***

The following table shows the fault codes of the DFS11B option:

| Byte 12 | Byte 13 | Designation (German) | Designation (English) | Meaning / correction procedure |
|---|---|---|---|---|
| $00_{hex}$ / $00_{dec}$ | $00_{hex}$ / $00_{dec}$ | kein Fehler | --- | See section "Fault table PROFIsafe DFS11B option" on page 124. |
| | $01_{hex}$ / $01_{dec}$ | Interner Ablauffehler | Internal sequence fault | |
| | $02_{hex}$ / $02_{dec}$ | Interner Systemfehler | Internal system fault | |
| | $03_{hex}$ / $03_{dec}$ | Fehler Kommunikation | Communication fault | |
| | $04_{hex}$ / $04_{dec}$ | Fehler Elektronikversorgung | Circuitry supply voltage fault | |
| | $14_{hex}$ / $20_{dec}$ | Interner Fehler am sicheren Eingang (F-DIx) | Internal fault failsafe input | |
| | $15_{hex}$ / $21_{dec}$ | Kurzschluss am sicheren Eingang (F-DIx) | Short circuit failsafe input | |
| | $32_{hex}$ / $50_{dec}$ | Interner Fehler am sicheren Ausgang (F-DOx) | Internal fault failsafe output | |
| | $33_{hex}$ / $51_{dec}$ | Kurzschluss am sicheren Ausgang (F-DOx) | Short circuit failsafe output | |
| | $34_{hex}$ / $52_{dec}$ | Überlast am sicheren Ausgang (F-DOx) | Overload failsafe output | |
| | $6F_{hex}$ / $111_{dec}$ | Interner Kommunikationsfehler zur DFS11B | Internal communication timeout | |
| | $7F_{hex}$ / $127_{dec}$ | Fehler Initialisierung DFS11B | F init fault | |

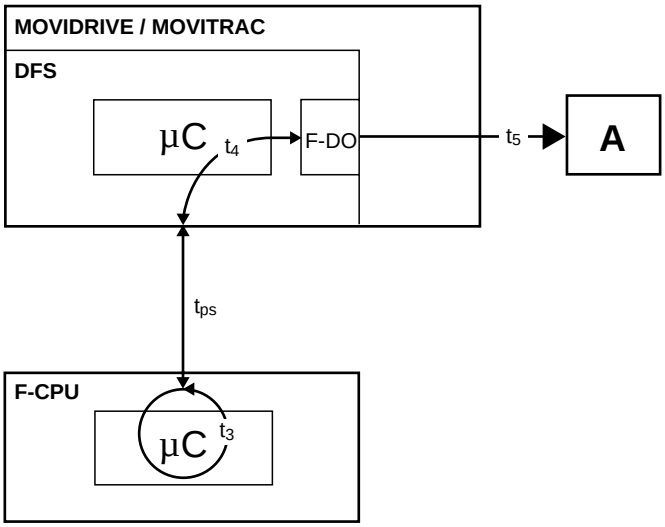
### 7.6.8 Response times of PROFIsafe option DFS

Response times play a decisive part in the design and execution of safety functions of systems and machines. In order to match the response time to the requirements of a safety function, always take the entire system from sensor (or control device) to actuator into account. The following times are decisive:

- Response times of the connected sensors
- Internal response time of the failsafe inputs (filter time + processing time)
- PROFIsafe cycle time
- Processing time (cycle time) in the safety control
- PROFIsafe monitoring time "F_WD_Time"
- Internal reaction time of the safe outputs
- Response or switching time of the actuator

***Response sequence in conjunction with the PROFIsafe option DFS***

The following figure shows the response sequence in conjunction with PROFIsafe option DFS:

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| | |
|---|---|
| DFS | PROFIsafe option |
| F CPU | Safety control |
| µC | Micro-controller |
| F-DO | Safe output |
| A | Actuator for activating the STO |

| Response time from safety control to actuator for controlling the STO | | |
|---|---|---|
| **t3** | Processing time in safety control | To be generated from the safety control |
| **$t_{ps}$** | PROFIsafe cycle time | According to safety control data |
| **t4** | Internal response time of the safe output | 25 ms |
| **t5** | Response or switching time of the actuator | According to the manufacturer |
| | Actuator switches after xx ms | Total |

PROFIsafe monitoring time ("F_WD_Time") plays an important role in determining the maximum response time for a safety requirement. This time must be set in the safety control for the DFS option.

For the response sequence described above, with the PROFIsafe monitoring time defined as $t_{WD}$, the following formula is used to calculate the maximum total response time for an event at the safety sensor to switching the actuator:

$$\mathbf{t_{response,max} = max \{t_{ps} + t3 + t_{ps} + t4\} + t5}$$

## 7.7 Procedure for starting up DFS11B with MOVIDRIVE® MDX61B

The following sections describe the startup procedure for MOVIDRIVE® MDX61B with the DFS11B PROFIBUS option step-by-step.

### 7.7.1 Preliminary work

***Step 1: Install the required software***

1. FTDI driver for USB11A programming interface
   - Connect USB11A to the PC. Windows hardware detection will install the required FTDI driver.
   - You can download the FTDI driver from the software ROM 7 or from SEW Eurodrive website.
2. GSD file: SEW_600C.GSD
3. MOVITOOLS® MotionStudio version 5.40 and higher.

***Step 2: Install units***

1. Install MOVIDRIVE® MDX61B according to the operating instructions:
   - Supply system cable
   - Motor cable
   - Braking resistor
   - DC 24 V backup voltage
   - You can download the FTDI driver from the software ROM 7 or from SEW Eurodrive website.
2. Install the PROFIBUS and connect the DFS11B to the PROFIBUS. Ensure that PROFIBUS is equipped with terminating resistors.

### 7.7.2 Switch on MOVIDRIVE® MDX61B with DC 24 V or AC 400 V

***Step 1: Configure MOVIDRIVE® MDX61B***

1. Start MOVITOOLS® MotionStudio and create a new project.

   Enter a project name and assign the USB11A programming interface according to the serial COM interface.

   - If the USB11A programming interface is connected to the PC for the first time, Windows hardware detection will install the required FTDI driver.
   - If USB11A is not recognized, check the assignment to the COM interface. The matching COM port is marked by "USB".

2. Connect the PC with MOVIDRIVE® using the USB11A programming interface.

3. Perform a unit scan. To do so, select the unit by clicking the left mouse button. Then click the right mouse button and choose [Startup] / [Parameter tree] from the context menu.

4. Set the *P100 setpoint source* and *P101 control source* parameters to "Fieldbus".

5. For simple control via fieldbus, you can set the binary inputs to "No function" using parameters P601 ... P608.

6. Check the parameter setting for the process data (P87x). The parameters for status word and control word must be set. Set the *P876 PO data enable* parameter to "Yes".

***Step 2: Configure PROFIBUS***

1. Start the control manufacturer's software to configure the hardware (e.g. STEP 7-HWCONFIG).

2. If the GSD file is not installed, install the GSD file SEW_600C.GSD now (see section "Preliminary work" on page 61).

3. Configure the PROFIBUS as described in this manual.
   - Assign the PROFIBUS address (DIP switch and STEP 7 project planning)
   - Configure the process data
   - Load the configuration into the controller

4. The **BUS FAULT** LED of the DFS11B option goes off when PROFINET is successfully configured. Process data is now being exchanged.

5. Extend the control program and establish the process data exchange with MOVIDRIVE®.

6. Start MOVITOOLS® MotionStudio and create a new project.

   Run the MOVITOOLS® MotionStudio via serial communication with USB11A or PROFIBUS (see section 10). Connect the PC with MOVIDRIVE® for this purpose.

7. Perform a unit scan.

8. Select MOVIDRIVE®, make a right mouse click and choose [Diagnostic] / [Bus monitor] from the context menu. Check whether process data exchange between controller and MOVIDRIVE® is working properly.

9. Switch on the supply voltage and enable MOVIDRIVE® at the terminals (DI00=1).

   Activate unit enable by setting control word 1 = 0x0006.

   If MOVIDRIVE® remains in "No Enable" condition, check the terminal assignment (parameter group P60x) and apply DC 24 V to more binary inputs if required.

## 7.8 Procedure for starting up DFS11B with MOVITRAC® B (gateway)

The following sections provide a step-by-step description of the startup procedure for MOVITRAC® B with the DFS11B PROFIBUS option as gateway.

### 7.8.1 Preliminary work

***Step 1: Install the required software***

1. FTDI driver for USB11A programming interface
   - Connect USB11A to the PC. Windows hardware detection will install the required FTDI driver.
   - You can download the FTDI driver from the software ROM 7 or from SEW Eurodrive website.
2. GSD file: SEW_6009.GSD
3. MOVITOOLS® MotionStudio version 5.40 and higher.

***Step 2: Install units***

1. Install MOVITRAC® B according to the operating instructions:
   - Supply system cable
   - Motor cable
   - Braking resistor
   - DC 24 V backup voltage
   - You can download the FTDI driver from the software ROM 7 or from SEW Eurodrive website.
2. Install the PROFIBUS and connect the gateway to the PROFIBUS. Make sure that PROFIBUS is equipped with terminating resistors.
3. Install the system bus as described in this manual.
4. Activate the terminating resistor at the last station.

### 7.8.2 Switch on the units with DC 24 V or AC 400 V

***Step 1: Configure MOVITRAC® B***

1. Start MOVITOOLS® MotionStudio and create a new project.

   Enter a project name and assign the USB11A programming interface according to the serial interface.
   - If the USB11A programming interface is connected to the PC for the first time, Windows hardware detection will install the required FTDI driver.
   - If USB11A is not recognized, check the assignment to the COM interface. The matching COM port is marked by "USB".

2. Connect the PC with MOVITRACDRIVE® using the USB11A programming interface.

3. Perform a unit scan. To do so, select the unit by clicking the left mouse button. Then click the right mouse button and choose [Startup] / [Parameter tree] from the context menu.

4. Set the *P881 SBus address* parameter in increasing sequence (1 ... 8) to a value other than 0. Set the *P883 SBus timeout* parameter to 50 ... 200 ms.

5. Set *P100 setpoint source* to "SBus1 / fixed setpoint" and *P101 control source* to "SBus1".

6. For simple control via fieldbus, you can set the binary inputs to "No function" using parameters P601 ... P608.

7. Check the parameter setting for the process data (parameter group P87x). The parameters for control word and status word must be set. Set the *P876 PO data enable* parameter to "Yes".

8. Repeat steps 2 to 7 for the individual units connected to the SBus.

9. Activate "Auto setup" function via DIP switch **AS** of the DFx gateway. Set the **AS** DIP switches to "1". H1 LED flashes during the scan and goes out after successful completion.

10. Connect the PC with the DFx gateway using the USB11A programming interface.

11. Perform a unit scan. The DFx gateway and all units installed at the SBus must be accessible now.

12. Select the DFx gateway, make a right mouse click and choose [Diagnostic] / [Monitor fieldbus gateway DFx] from the context menu. Go to the "Gateway Configuration" tab page and check whether the "Auto setup" function has recognized all units. If not, check
    - the SBus installation
    - whether the terminating resistor is connected to the final unit
    - the SBus addresses of the individual units.

***Step 2: Configure PROFIBUS***

1. Start the control manufacturer's software to configure the hardware (e.g. STEP 7-HWKONFIG).

2. If the GSD file is not installed, install the GSD file SEW_600C.GSD now (see section "Preliminary work" on page 61).

3. Configure the PROFIBUS as described in this manual.
   - Assign the PROFIBUS address (DIP switch and STEP 7 project planning)
   - Configure the process data
   - Load the configuration into the controller

4. The **BUS FAULT** LED of the DFS11B option goes off when PROFINET is successfully configured. Process data is now being exchanged.

5. Extend the control program and establish the process data exchange with MOVITRAC® B.

6. Start MOVITOOLS® MotionStudio and create a new project.

   Run the MOVITOOLS® MotionStudio via serial communication with USB11A or PROFIBUS (see section 10). Connect the PC with MOVITRAC® for this purpose.

7. Perform a unit scan.

8. Select MOVITRAC®, make a right mouse click and choose [Diagnostic] / [Bus monitor] from the context menu. Check whether process data exchange between controller and MOVITRAC® B is working properly.

9. Switch on the supply voltage and enable MOVITRAC® B at the terminals (DI00=1).

   Activate unit enable by setting control word 1 = 0x0006.

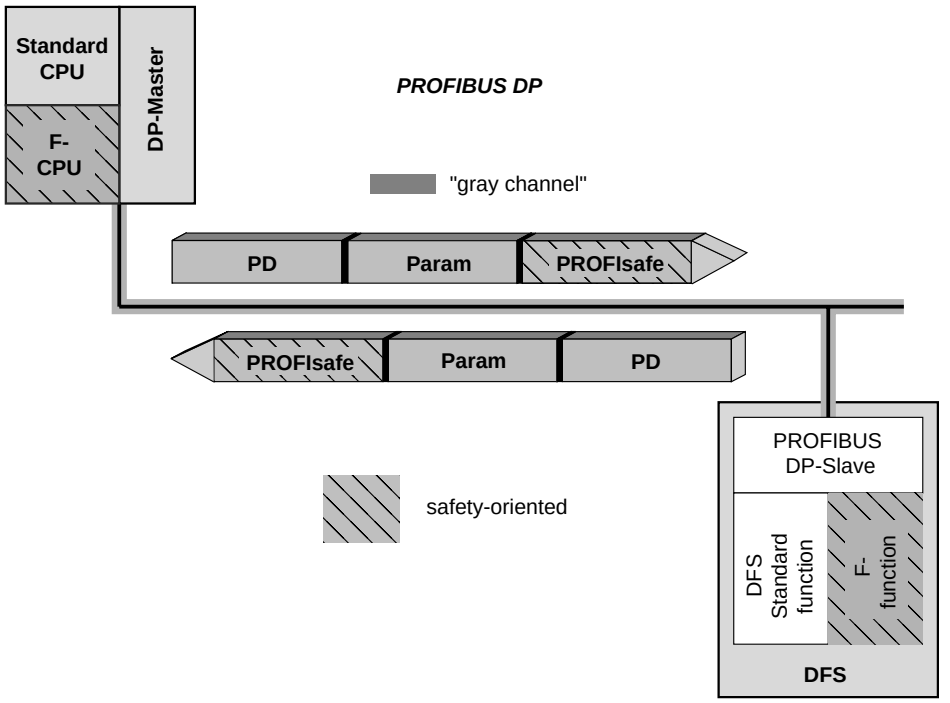
   If MOVITRAC® B remains in "No Enable" condition, check the terminal assignment (parameter group P60x) and apply DC 24 V to more binary inputs if required.

# 8 PROFIBUS DP operating characteristics

This section describes the basic characteristics of the drive inverter with PROFIBUS DP.

## *8.1 Data exchange with the DFS11B option*

Data is exchanged between PROFIBUS master and DFS via PROFIBUS DP, which at the same time represents the "gray channel" for the safety-oriented application. This means the transmitted DP telegrams contain standard information of conventional operation with MOVIDRIVE® / MOVITRAC® at PROFIBUS DP as well as the PROFIsafe® safety telegram. Depending on the configuration, the maximum available expansion level enables the exchange of PROFIsafe® safety data, the parameter channel, and the process data between DP master and DFS as shown in the following figure.



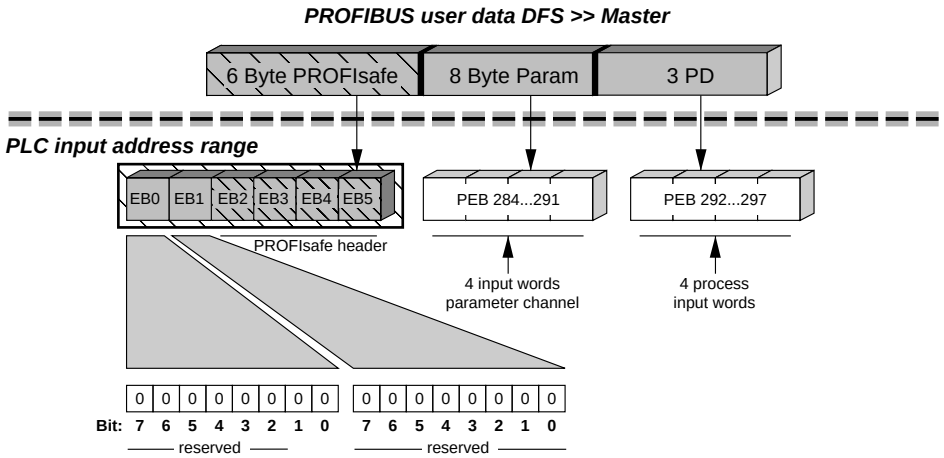
### 8.1.1 Mapping the DFS in the address range of the PLC

The user data information transmitted using PROFIBUS-DP is mapped in the input and output address range in the controller. The standard CPU uses the standard user data (process data and 8-byte parameter channel) for processing purposes. The PROFIsafe® data can only be used by the F-CPU. The figures below refer to the following PROFIBUS configuration:

| | E address | A address |
|---|---|---|
| F module I/O (2 byte) | 0 ... 5 | 0 ... 5 |
| Param (4 words) | 284 ... 291 | 284 ... 291 |
| 3 PD (3 words) | 292 ... 297 | 292 ... 297 |

For the safety-oriented function, 16 input and output bits are available in the F-CPU. Only one output bit of them is used (for F-DO0). All other bits are to be regarded as reserved and set to "0".

The following figure shows the input data in the input address range of the PLC.

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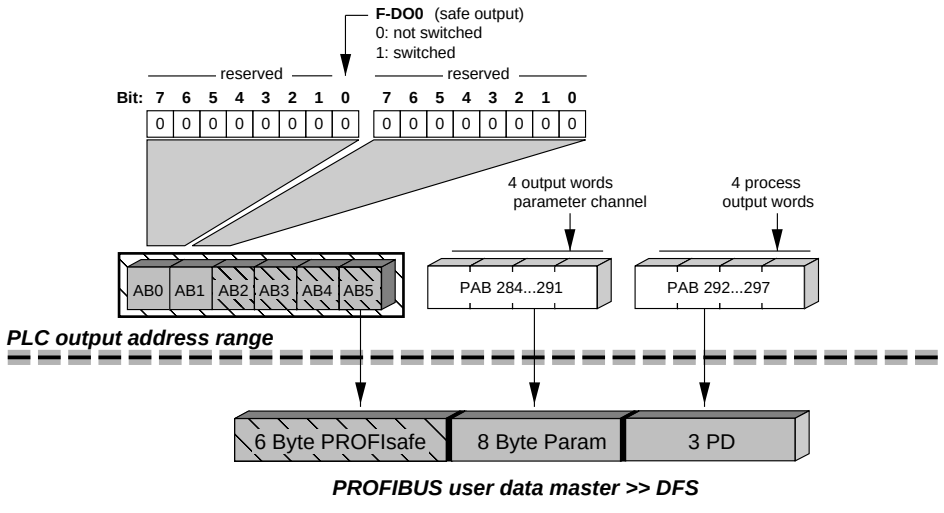
The following figure shows the DFS data in the output address range of the PLC.

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### 8.1.2 F periphery DB of PROFIsafe option DFS

During compilation in the HW Config tool (HWCONFIG), the system automatically generates an F periphery DB for every PROFIsafe option DFS. The F periphery DB provides the user with an interface in which s/he can evaluate or control variables in the safety program.

The symbolic name consists of the invariable prefix "F", the start address of the F periphery, and the name entered in the object properties during configuration for the F periphery (e.g. F00008_198).

The following table shows the F periphery DB of PROFIsafe option DFS:

| | Address | Symbol | Data type | Function | Default |
|---|---|---|---|---|---|
| **User-controllable variables** | DBX0.0 | “F00008_198.PASS_ON“ | Bool | 1 = activate passivation | 0 |
| | DBX0.1 | “F00008_198.ACK_NEC“ | Bool | 1 = acknowledgment required for reintegration with DFS | 1 |
| | DBX0.2 | “F00008_198.ACK_REI“ | Bool | 1 = acknowledgment for reintegration | 0 |
| | DBX0.3 | “F00008_198.IPAR_EN“ | Bool | Variable for resetting parameters (not supported by PROFIsafe option DFS) | 0 |
| **Variables that can be evaluated** | DBX2.0 | “F00008_198.PASS_OUT“ | Bool | Run passivation | 1 |
| | DBX2.1 | “F00008_198.QBAD“ | Bool | 1 = substitute values are output | 1 |
| | DBX2.2 | “F00008_198.ACK_REQ“ | Bool | 1 = acknowledgment required for reintegration | 0 |
| | DBX2.3 | “F00008_198.IPAR_OK “ | Bool | Variable for resetting parameters (not supported by PROFIsafe option DFS) | 0 |
| | DBB3 | “F00008_198.DIAG“ | Byte | Service information | |

***PASS_ON***

This variable lets you activate passivation of the PROFIsafe option DFS. Provided that PASS_ON = 1, the F periphery is passivated.

***ACK_NEC***

After a fault has been corrected, the PROFIsafe option DFS is reintegrated, depending on ACK_NEC.

- ACK_NEC = 0: automatic reintegration occurs
- ACK_NEC = 1: automatic reintegration occurs following acknowledgement by the user

**HAZARD**

It is only permissible to set the variable ACK_ NEC = 0 if automatic reintegration is safe for the process in question.

- Check if automatic reintegration is permissible for the process in question.

***ACK_REI***

In order to reintegrate PROFIsafe option DFS after the fault has been corrected, user acknowledgement with positive edge of variable ACK_REI is required. Acknowledgement is only possible if variable ACK_REQ = 1.

***ACK_REQ***

The F control system sets ACK_REQ = 1 after all faults in the data exchange with PROFIsafe option DFS have been corrected. After successful acknowledgement, the F control system sets ACK_REQ = 0.

***PASS_OUT*** Indicates whether PROFIsafe option DFS has been passivated. Substitute values are output

***QBAD*** Fault in the data exchange with PROFIsafe option DFS. Indicates passivation. Substitute values are output

***DIAG*** For service information purposes, the variable DIAG supplies non-failsafe information about faults that have occurred in the F control system. For further information refer to the relevant F control system manual.

### *Input and output data*

*Output data*

| Byte | Bit | Name | Default | Function | Comment |
|---|---|---|---|---|---|
| **0** | **0** | STO | 0 | Safe disconnection of the drive – "Safe Torque Off" | 0-active |
| | **1 ... 7** | – | 0 | Reserved | Do not use |

*Input data*

| Byte | Bit | Name | Default | Function | Comment |
|---|---|---|---|---|---|
| **0** | **0** | POWER_REMOVED | 0 | Response safe output F-DO_STO switched – "Power removed" | 1-active |
| | **1 ... 7** | – | 0 | Reserved | Do not use |

## 8.2 Controlling the MOVIDRIVE® MDX61B drive inverter

The drive inverter is controlled via the process data channel which is up to 10 I/O words in length. These process data words are reproduced in the I/O and/or peripheral area of the controller, for example when a programmable logic controller is used as the DP master. As a result, they can be addressed in the usual manner.

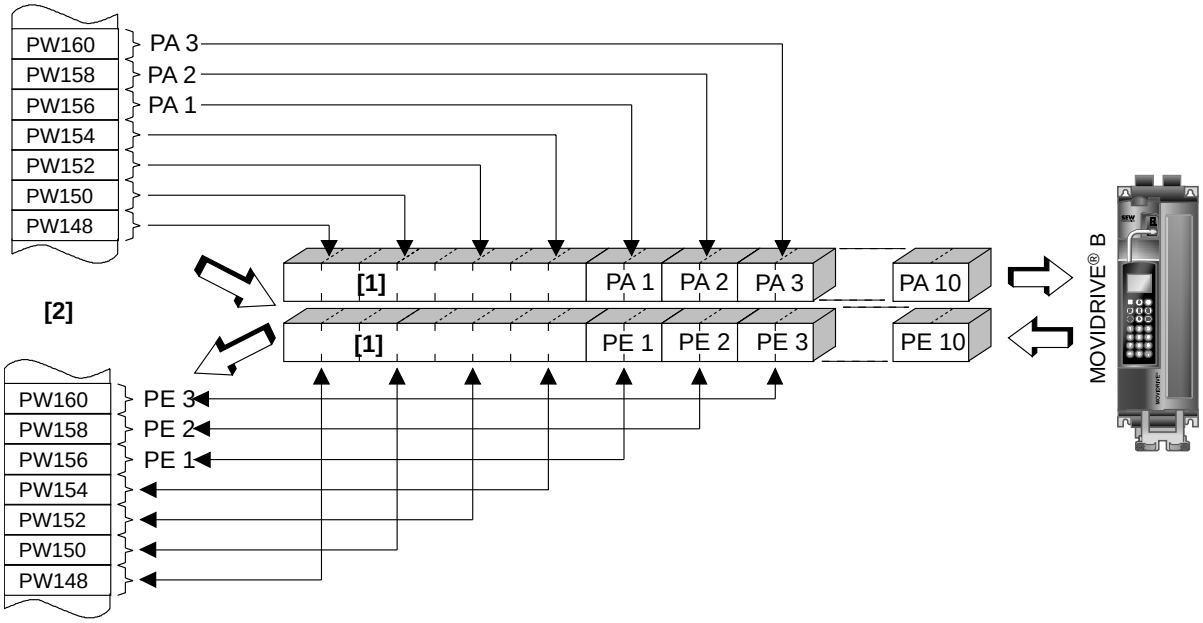


*Figure 9: Mapping PROFIBUS data in the PLC address range*

[1] 8 byte MOVILINK® parameter channel

[2] PLC address range

| | |
|---|---|
| PI1 ... PI10 | Process input data |
| PO1 ... PO10 | Process output data |

- For additional information on programming and project planning, refer to the README_ file included in the GSD file.
- For more information about controlling via the process data channel, in particular regarding the coding of the control and status word, refer to the Fieldbus Unit Profile manual.

### 8.2.1 Control example for SIMATIC S7 with MOVIDRIVE® MDX61B

The drive inverter is controlled via SIMATIC S7 depending on the selected process data configuration, either directly via load and transfer commands or via the special system functions *SFC 14 DPRD_DAT* and *SFC15 DPWR_DAT*.

In principle, S7 data lengths of 3 bytes or more than 4 bytes must be transmitted using system functions SFC14 and SFC15.

Consequently, the data in the following table applies:

| Process data configuration | STEP 7 access via |
|---|---|
| 1 PD | Load / transfer commands |
| 2 PD | Load / transfer commands |
| 3 PD | System functions SFC14 / 15 (length 6 bytes) |
| 6 PD | System functions SFC14 / 15 (length 12 bytes) |
| 10 PD | System functions SFC14 / 15 (length 20 bytes) |
| Param + 1 PD | Parameter channel: System functions SFC14 / 15 (length 8 bytes)<br>Process data: Load / transfer commands |
| Param + 2 PD | Parameter channel: System functions SFC14 / 15 (length 8 bytes)<br>Process data: Load / transfer commands |
| Param + 3 PD | Parameter channel: System functions SFC14 / 15 (length 8 bytes)<br>Process data: System functions SFC14 / 15 (length 6 bytes) |
| Param + 6 PD | Parameter channel: System functions SFC14 / 15 (length 8 bytes)<br>Process data: System functions SFC14 / 15 (length 12 bytes) |
| Param + 10 PD | Parameter channel: System functions SFC14 / 15 (length 8 bytes)<br>Process data: System functions SFC14 / 15 (length 20 bytes) |

### 8.2.2 PROFIBUS DP timeout (MOVIDRIVE® MDX61B)

If the data transfer via PROFIBUS DP is faulty or interrupted, the response monitoring time in MOVIDRIVE® elapses (if configured in the DP master). The **BUS FAULT** LED lights up or flashes to indicate that no new user data is being received. At the same time, MOVIDRIVE® performs the error response selected with *P831 Fieldbus timeout response*.

*P819 Fieldbus timeout* displays the response monitoring time specified by the DP master during the PROFIBUS DP startup. The timeout can only be changed via the DP master. Although modifications made using the keypad or MOVITOOLS® are displayed, they do not have any effect and are overwritten when the DP is next started up.

### 8.2.3 Fieldbus timeout response (MOVIDRIVE® MDX61B)

P831 is used to sets the parameters for the fault response, which is triggered by the fieldbus timeout monitoring. The setting made here must correspond to the setting in the master system (S7: response monitoring).

## 8.3 Controlling the MOVITRAC® B inverter (gateway)

The inverter is controlled via the process data channel, which is up to 3 I/O words in length. These process data words are reproduced in the I/O or peripheral area of the controller, for example when a programmable logic controller is used as the DP master. As a result, they can be addressed in the usual manner.

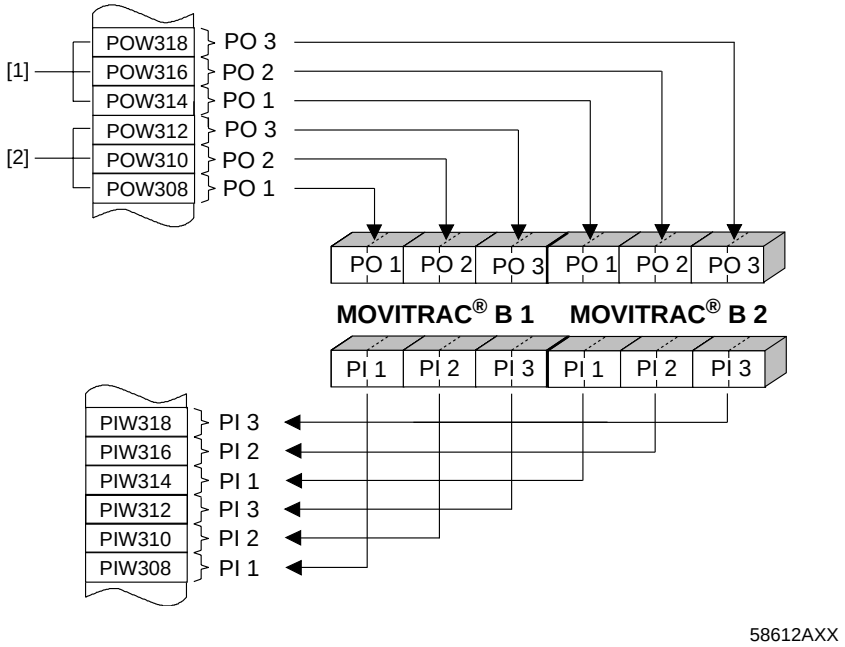


*Figure 10: Mapping PROFIBUS data in the PLC address range*

[1] Address range MOVITRAC® B, unit 2

[2] Address range MOVITRAC® B, unit 1

PO = Process output data

PI = Process input data

Additional information on programming and project planning can be found in the README_GSD6009.PDF file included in the GSD file.

### 8.3.1 Control example for SIMATIC S7 with MOVITRAC® B (gateway)

The drive inverter is controlled via SIMATIC S7 depending on the selected process data configuration, either directly via load and transfer commands or via the special system functions SFC 14 DPRD_DAT and SFC15 DPWR_DAT.

In principle, S7 data lengths of 3 bytes or more than 4 bytes must be transmitted using system functions SFC14 and SFC15.

| Process data configuration | STEP 7 access via |
|---|---|
| 3 PD ... 24 PD | System functions SFC14/15<br>(length: 6 ...48 bytes) |
| Param + 3 PD ... 24 PD | System functions SFC14/15<br>(length 6 ... 48 bytes for PD + 8 bytes for parameter) |

### 8.3.2 SBus timeout

If one or more drive inverters on the SBus can no longer be addressed by the DFS , the gateway enters error code *F11 System fault*, in status word 1 of the corresponding inverter. The **H1** LED (system fault) lights up, and the error is also displayed via the diagnostics interface. It is necessary to set the *SBus timeout interval (P815)* of the MOVITRAC® B system error to a value other than 0 for the inverter to stop. The error resets itself in the gateway. In other words, the current process data is exchanged immediately after restarting the communication.

### 8.3.3 Unit error

The gateways detect a series of errors during the self test and respond by locking themselves. The exact error responses and remedies can be found in the list of errors. A hardware defect causes error *F111 system fault* to be displayed on the fieldbus process input data for status words 1 of all drive inverters. The **H1** LED (system fault) at the DFS then flashes at regular intervals. The exact fault code is displayed in the status of the gateway using MOVITOOLS® MotionStudio on the diagnostic interface.

### 8.3.4 Fieldbus timeout of the DFS11B in gateway operation

You can set how the gateway should respond in case of timeout using the *P831 Fieldbus timeout response* parameter.

| | |
|---|---|
| No response | The drives on the subordinate SBus continue with the last setpoint value. These drives cannot be controlled when the PROFIBUS communication is interrupted. |
| PA_DATA = 0 | Rapid stop is activated for all drives that have a process data configuration with control word 1 or 2 when a PROFINET timeout is detected. For this, the gateway sets the bits 0 to 2 of the control word to 0.<br>The drives are stopped with the rapid stop ramp. |

## *8.4 SIMATIC S7 example program*

This example is a special and free service that demonstrates only the basic approach to generating a PLC program as a non-binding sample. We are not liable for the contents of the example program.

In this example, the project planning for MOVIDRIVE® or MOVITRAC® has the process data configuration "3 PD" on input addresses PIW576... and output addresses POW576.... A data block DB3 is created with about 50 data words.

When SFC14 is called, the process input data is copied to data block DB3, data words 0, 2 and 4. When SFC15 is called after the control program has been processed, the process output data are copied from data words 20, 22 and 24 to the output address POW 576 ...

Note the length specification in bytes for the RECORD parameter. The length information must correspond to the configured length.

Refer to the online help for STEP 7 for further information about the system functions.

```
//Start of cyclical program processing in OB1
BEGIN
NETWORK
TITLE = Copy PI data from inverter to DB3, words 0/2/4
CALL SFC  14 (DPRD_DAT)    //READ DP slave record
  LADDR  := W#16#240 //Input address 576
  RET_VAL:= MW 30          //Result in flag word 30
  RECORD := P#DB3.DBX 0.0 BYTE 6 //Pointer

NETWORK
TITLE =PLC program with drive application
// PLC program uses the process data in DB3 for
// drive control

L  DB3.DBW 0//Load PI1 (status word 1)
L  DB3.DBW 2      //Load PI2 (actual speed value)
L  DB3.DBW 4      //Load PI3 (no function)

L  W#16#0006
T DB3.DBW 20//Write 6hex to PO1 (control word = enable)
L 1500
T DB3.DBW 22//Write 1500dec to PO2 (speed setpoint = 300 rpm)
L  W#16#0000
T DB3.DBW 24//Write 0hex to PO3 (however, it has no function)

//End of cyclical program processing in OB1
NETWORK
TITLE =Copy PO data from DB3, word 20/22/24 to inverter
CALL SFC  15 (DPWR_DAT)            //WRITE DP slave record
  LADDR  := W#16#240               //Output address 576 = 240hex
  RECORD := P#DB3.DBX 20.0 BYTE 6  //Pointer to DB/DW
  RET_VAL:= MW 32                  //Result in flag word 32
```

## 8.5 Parameter setting via PROFIBUS DP

In the PROFIBUS DP system, the parameters are accessed via the 8-byte MOVILINK® parameter channel. This parameter channel offers extra parameter services in addition to the conventional READ and WRITE services.

The inverter parameter settings via the PROFIBUS DP parameter channel can only be used for MOVIDRIVE® MDX61B and the parameters of the DFS11B gateway.

The PROFIBUS DP parameter channel does not provide data access to the parameters of inverters that are installed below the gateway at the SBus.

### 8.5.1 Structure of the 8 byte MOVILINK® parameter channel

PROFIBUS DP enables access to the inverter drive parameters via the "parameter process data object" (PPO). This PPO is transmitted cyclically and contains the process data channel [2] and a parameter channel [1] that can be used to exchange acyclical parameter values.

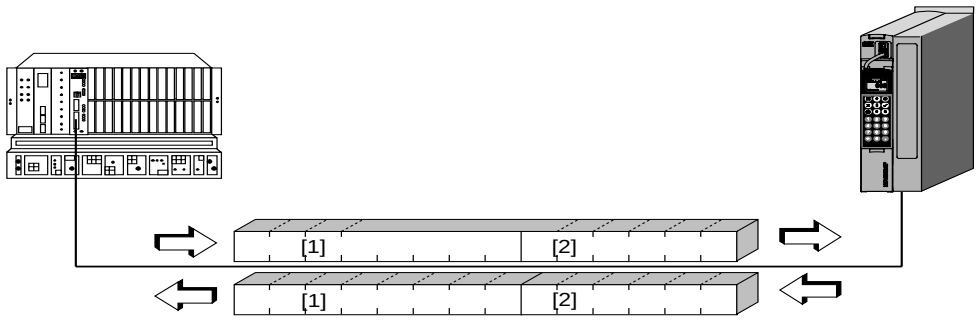


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*Figure 11: Communication via PROFIBUS DP*

[1] Parameter channel

[2] Process data channel

The following table shows the structure of the 8 byte MOVILINK® parameter channel.

Basic structure:

- One management byte
- One index word
- One reserved byte
- 4 data bytes

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| Management | Subindex (reserved) | Index high | Index low | Data MSB | Data | Data | Data LSB |
| | | Parameter index | | 4-byte data | | | |

***Management of the 8-byte MOVILINK® parameter channel***

The entire procedure for setting parameters is coordinated using management byte 0 . This byte provides important service parameters of the service performed, such as

- Service identifier
- Data length
- Execution
- Status

The following table shows that bits 0, 1, 2 and 3 contain the service identifier, and define which service is performed. Bits 4 and bit 5 specify the data length in bytes for the WRITE service; it should be set to 4 bytes for all SEW drive inverters.

| 7/MSB | 6 | 5 | 4 | 3 | 2 | 1 | 0/LSB |
|---|---|---|---|---|---|---|---|
| | | | | **Service identifier**<br>0000 = No service<br>0001 = READ parameter<br>0010 = WRITE parameter<br>0011 = WRITE parameter volatile<br>0100 = READ minimum<br>0101 = READ maximum<br>0110 = READ default<br>0111 = READ scale<br>1000 = READ attribute | | | |
| | | **Data length**<br>00 = 1 byte<br>01 = 2 bytes<br>10 = 3 bytes<br>11 = 4 bytes (must be set) | | | | | |
| | **Handshake bit**<br>Must be changed on every new task in cyclical transmission. | | | | | | |
| **Status bit**<br>0 = No error during execution of service<br>1 = Error during execution of service | | | | | | | |

Bit 6 is used as handshake between controller and inverter. It triggers execution of the transmitted service in the inverter. In PROFIBUS DP, the parameter channel is transmitted cyclically with the process data. For this reason, the implementation of the service in the inverter must be triggered by edge control using handshake bit 6. For this purpose, the value of this bit is altered for each new service that is to be executed. The inverter uses the handshake bit to signal whether the service has been executed or not. The service was executed if the handshake bit received in the controller is identical with the transmitted handshake bit. Status bit 7 indicates whether it was possible to execute the service properly or if errors occurred.

***Index addressing***

Byte 2: Index high and byte 3: Index low determines the parameter read or written via the fieldbus system. The parameters of an inverter are addressed with a uniform index regardless of the fieldbus system which is connected. Byte 1 should be viewed as reserved and must always be set to 0x00.

***Data range***

As shown in the following table, the data is contained in byte 4 through byte 7 of the parameter channel. This means up to 4 bytes of data can be transmitted per service. The data is always entered with right-justification; that is, byte 7 contains the least significant data byte (data LSB) whereas byte 4 is the most significant data byte (data MSB).

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| Manage-ment | Subindex | Index high | Index low | Data MSB | Data | Data | Data LSB |
| | | | | High byte 1 | Low byte 1 | High byte 2 | Low byte 2 |
| | | | | High word | | Low word | |
| | | | | Double word | | | |

***Incorrect execution of a service***

The status bit in the management byte is set to signal that a service has been executed incorrectly. If the received handshake bit is identical to the transmitted handshake bit, the inverter has executed the service. If the status bit now signals an error, the error code is entered in the data range of the parameter telegram. Bytes 4-7 send back the return code in a structured format. See section "Return codes of parameter setting" on page 82.

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| Manage-ment | Subindex | Index high | Index low | Error class | Error code | Add. code high: | Add. code low |
| Status bit = 1: Incorrect execution of a service | | | | | | | |

### 8.5.2 Reading a parameter via PROFIBUS DP (READ)

Due to the cyclical transfer of the parameter channel, to execute a READ service via the 8-byte MOVILINK® parameter channel, the handshake bit may only be changed if the complete parameter channel has been set up for the specific service. As a result, adhere to the following sequence when reading a parameter:

1. Enter the index of the parameter to be read in byte 2 (index high) and byte 3 (index low).
2. Enter the service identifier for the READ service in the management byte (byte 0).
3. Transfer the READ service to the inverter by changing the handshake bit.

Since this is a read service, the sent data bytes (bytes 4...7) and the data length (in the management byte) are ignored and do not need to be set. This means they need not be set.

The inverter now processes the READ service and sends the service confirmation back by changing the handshake bit.

| 7/MSB | 6 | 5 | 4 | 3 | 2 | 1 | 0/LSB |
|---|---|---|---|---|---|---|---|
| 0 | 0/1[1)] | X[2)] | X[2)] | 0 | 0 | 0 | 1 |
| | | | | **Service identifier**<br>0001 = READ parameter | | | |
| | | **Data length**<br>Not relevant for READ service | | | | | |
| | **Handshake bit**<br>Must be changed on every new task in cyclical transmission. | | | | | | |
| **Status bit**<br>0 = No error during execution of service<br>1 = Error during execution of service | | | | | | | |

1) Bit value is changed

2) Not relevant

The above table shows how a READ service is coded in the management byte. The data lenght is irrelevant. You only need to enter the service identifier for the READ service. This service is now activated in the inverter when the handshake bit changes. It would be possible to activate the READ service with the management byte coding 01hex or 41hex.

### 8.5.3 Writing a parameter via PROFIBUS DP (WRITE)

Due to the cyclical transfer of the parameter channel, to execute a WRITE service via the 8 byte MOVILINK® parameter channel, the handshake bit may only be changed if the complete parameter channel has been set up for the specific service. Observe the following sequence when writing a parameter:

1. Enter the index of the parameter to be written in byte 2 (index high) and byte 3 (index low).
2. Enter the data to be written in bytes 4 ... 7.
3. Enter the service identifier and the data length for the WRITE service in the management byte (byte 0).
4. Transfer the WRITE service to the inverter by changing the handshake bit.

The inverter now processes the WRITE service and sends the confirmation back by changing the handshake bit.

The following table shows how a WRITE service is coded in the management byte. The data length is 4 bytes for all parameters of SEW inverters. This service is now transferred to the inverter when the handshake bit changes. This means a WRITE service to SEW inverters generally has the management byte coding 32 hex or 72 hex.

| 7/MSB | 6 | 5 | 4 | 3 | 2 | 1 | 0/LSB |
|---|---|---|---|---|---|---|---|
| 0 | 0/1[1)] | 1 | 1 | 0 | 0 | 1 | 0 |
| | | | | **Service identifier**<br>0010 = WRITE parameter | | | |
| | | **Data length**<br>11 = 4 bytes | | | | | |
| | **Handshake bit**<br>Must be changed on every new task in cyclical transmission. | | | | | | |
| **Status bit**<br>0 = No error during execution of service<br>1 = Error during execution of service | | | | | | | |

1) Bit value is changed

### 8.5.4 Parameter setting procedure with PROFIBUS DP

Using the WRITE service as an example, the following figure represents a process of setting parameters between the controller and the inverter via PROFIBUS DP. To simplify the sequence, the following figure only shows the management byte of the parameter channel.

The parameter channel is only received and returned by the inverter while the control is preparing the parameter channel for the WRITE service. The service is not activated until the moment when the handshake bit is changed (in this example, when it changes from 0 to 1). The inverter now interprets the parameter channel and processes the WRITE service, but continues to answer all telegrams with handshake bit = 0. The executed service is acknowledged with a change of the handshake bit in the response telegram of the inverter. The controller now detects that the received handshake bit is once again the same as the one which was sent. It can now prepare another parameter setting procedure.

| Control | PROFIBUS DP(V0) | | | Inverter (slave) |
|---|---|---|---|---|
| | -- | 0**0**110010XXX... | → | Parameter channel is received, but not evaluated |
| | ← | 0**0**110010XXX... | -- | |
| Parameter channel is prepared for the WRITE service | | | | |
| Handshake bit is changed and the service is transferred to the inverter | -- | 0**1**110010XXX... | → | |
| | ← | 0**0**110010XXX... | -- | |
| | -- | 0**1**110010XXX... | → | |
| | ← | 0**0**110010XXX... | -- | WRITE service is performed, handshake bit is changed |
| Service confirmation is received as the send and receive handshake bits are the same again | ← | 0**1**110010XXX... | -- | |
| | -- | 0**1**110010XXX... | → | Parameter channel is received, but not evaluated |

### 8.5.5 Parameter data format

When parameters are set via the fieldbus interface, the same parameter coding is used as with the serial RS-485 interfaces and/or the system bus.

The data formats and ranges of values for the individual parameters can be found in the publication MOVIDRIVE® "parameter list".

### 8.5.6 Return codes for parameterization

***Elements***

In the event of an incorrect parameter setting, the inverter sends back various return codes to the master which set the parameters. These codes provide detailed information about what caused the error. Generally, these return codes are structured. There is a distinction between the following elements:

- Error class
- Error code
- Additional code

These return codes are described in detail in the Fieldbus Communications Profile manual and are not included in this documentation. However, the following special cases can occur in connection with PROFIBUS:

***Error class***

The error class element provides a more exact classification of the error type. MOVIDRIVE® supports the following error classes defined in accordance with EN 50170(V2):

| Class (hex) | Designation | Meaning |
|---|---|---|
| 1 | vfd state | Status error of the virtual field device |
| 2 | application reference | Error in application program |
| 3 | definition | Definition error |
| 4 | resource | Resource error |
| 5 | service | Error during execution of service |
| 6 | access | Access error |
| 7 | ov | Error in the object list |
| 8 | other | Other error (see section "Additional code" on page 83) |

The error class is generated by the communication software of the fieldbus interface if there is an error in communication. This statement does not apply to *Error class 8 = Other error*. Return codes sent from the inverter system are all included in *Error class 8 = Other error*. The error can be identified more precisely using the *additional code* element.

***Error code***

The error code element provides a means for more precisely identifying the cause of the error within the error class. It is generated by the communication software of the fieldbus card in the event of an error in communication. For *Error class 8 = Other error*, only *Error code = 0 (Other error code)* is defined. In this case, detailed identification is made using the *additional code*.

***Additional code***

The additional code contains the return codes specific to SEW dealing with incorrect parameter settings of the inverter. These codes are returned to the master under *Error class 8 = Other error*. The following table shows all possible codings for the additional code.

| Add. code high (hex) | Add. code low (hex) | Meaning |
|---|---|---|
| 00 | 00 | No error |
| 00 | 10 | Illegal parameter index |
| 00 | 11 | Function/parameter not implemented |
| 00 | 12 | Read access only |
| 00 | 13 | Parameter lock is active |
| 00 | 14 | Factory setting is active |
| 00 | 15 | Value for parameter too large |
| 00 | 16 | Value for parameter too small |
| 00 | 17 | Required option card missing for this function/parameter |
| 00 | 18 | Error in system software |
| 00 | 19 | Parameter access via RS-485 process interface on X13 only |
| 00 | 1A | Parameter access via RS-485 diagnostic interface only |
| 00 | 1B | Parameter is access-protected |
| 00 | 1C | Controller inhibit required |
| 00 | 1D | Invalid value for parameter |
| 00 | 1E | Factory setting was activated |
| 00 | 1F | Parameter was not saved in EEPROM |
| 00 | 20 | Parameter cannot be changed with enabled output stage |

### 8.5.7 Special cases

***Special return codes***

Errors in the parameter settings that cannot be identified either automatically by the application layer of the fieldbus system or by the system software of the inverter are treated as special cases. The following is a list of errors that can occur depending on the fieldbus interface used:

- Incorrect coding of a service via parameter channel
- Incorrect length specification of a service via parameter channel
- Internal communication error

***Incorrect service code in the parameter channel***

Incorrect code was specified in the management byte or reserved byte during parameter setting via the parameter channel. The following table shows the return code for this special case.

| | Code (dec) | Meaning |
|---|---|---|
| Error class: | 5 | Service |
| Error code: | 5 | Illegal parameter |
| Add. code high: | 0 | – |
| Add. code low: | 0 | – |

*Troubleshooting*

Check bits 0 and 1 in the parameter channel.

***Incorrect length specification in parameter channel***

A data length other than 4 data bytes was specified in a READ or WRITE service during parameter setting via the parameter channel. The following table displays the return codes.

| | Code (dec) | Meaning |
|---|---|---|
| Error class: | 6 | Access |
| Error code: | 8 | Type conflict |
| Add. code high: | 0 | – |
| Add. code low: | 0 | – |

*Troubleshooting*

Check bits 4 and 5 for the data length in the management byte of the parameter channel. Both bits must be set to 1.

***Internal communication error***

The return code listed in the following table is sent back if a communication error has occurred within the system. The parameter service transferred via the fieldbus may not have been performed and has to be repeated. If this error occurs again, switch off the inverter completely and then back on again so it is re-initialized.

| | Code (dec) | Meaning |
|---|---|---|
| Error class: | 6 | Access |
| Error code: | 2 | Hardware fault |
| Add. code high: | 0 | – |
| Add. code low: | 0 | – |

*Troubleshooting*

Repeat the READ or WRITE service. If the error occurs again, briefly disconnect the inverter from the power supply and switch it on again. If the error persists, consult the SEW Service.

# 9 PROFIBUS DP-V1 Functions

This section provides you with information about the PROFIBUS DP-V1 functions.

## *9.1 Introduction to PROFIBUS DP-V1*

This section describes the functions and terms used for operating SEW inverters at PROFIBUS DP-V1. Refer to the PROFIBUS user organization or visit PROFIBUS website for detailed technical information on PROFIBUS DP-V1.

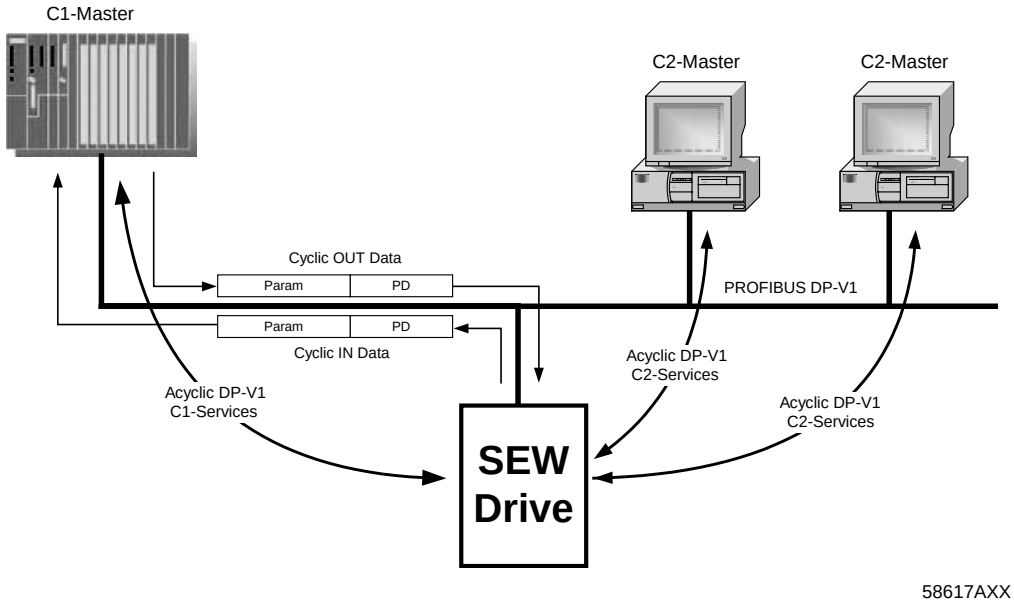
The PROFIBUS DP-V1 specification introduced new acyclical *READ / WRITE* services as part of the PROFIBUS DP-V1 expansions. These acyclical services are inserted into special telegrams during ongoing cyclical bus operation and thus ensure compatibility between PROFIBUS DP (version 0) and PROFIBUS DP**V1** (**V**ersion **1**).

The acyclical *READ/WRITE* services can be used to exchange larger data quantities between master and slave (inverter) than it would be possible to transfer in the cyclical input or output data using the 8-byte parameter channel, for example. The advantage of the acyclical data exchange via DP-V1 lies in the minimum load on the cyclical bus operation since DP-V1 telegrams are only added to the bus cycle if required.

The DP-V1 parameter channel provides the user with 2 options:

- The higher-level controller can access all the device information of the SEW DP-V1 slaves. This means that cyclical process data and unit settings can be read, stored in the controller and modified in the slave.
- It is also possible to route the service and startup tool MOVITOOLS® MotionStudio via the DP-V1 parameter channel instead of using a proprietary RS-485 connection. Once you have installed the MOVITOOLS® MotionStudio software, you can access detailed information in the folder ...\SEW\MOVITOOLS\Fieldbus.

The main features of PROFIBUS DP-V1 are explained below.



### 9.1.1 Class 1 master (C1 master)

The PROFIBUS DP-V1 network differentiates between various master classes. The C1 master essentially performs the cyclical data exchange with the slaves. A typical C1 master is a control system, such as a PLC, that exchanges cyclical process data with the slave. If the DP-V1 function has been activated via the GSD file, the acyclical connection between C1 master and slave is established automatically when the cyclical connection of the PROFIBUS DP-V1 is being established. Only one C1 master can be operated in a PROFIBUS DP-V1 network.

### 9.1.2 Class 2 master (C2 master)

The C2 master itself does not perform cyclical data exchange with the slaves. Examples for a typical C2 master are visualization systems or temporary installed programming devices (Notebook / PC). The C2 master uses exclusively acyclic connections for communication with the slaves. The acyclic connections between C2 master and slave are established by the *Initiate* service. The connection is established once the *Initiate* service has been performed successfully. An established connection enables cyclical data exchange with the slaves using *READ* or *WRITE* services. Several C2 masters can be active in a DP-V1 network. The number of C2 connections, established simultaneously for a slave, is determined by the slave. SEW inverters support two parallel C2 connections.

### 9.1.3 Data sets (DS)

The user data transported via a DP-V1 service are collected in data sets. Each data set is represented uniquely by its length, a slot number and an index. The structure of data set 47 is used for DP-V1 communication with the SEW inverter. This data set is defined as the DP-V1 parameter channel for drives as of V3.1 in the PROFIdrive profile drive engineering of the PROFIBUS user organization. Different procedures for accessing parameter data in the inverter are provided via this parameter channel.

### 9.1.4 DP-V1 services

The DP-V1 expansions offer new services, which can be used for acyclical data exchange between master and slave. The system distinguishes between the following services:

| C1 master | Connection type: MSAC1 (master/slave acyclical C1) |
|---|---|
| READ | Read data set |
| WRITE | Write data set |

| C2 master | Connection type: MSAC2 (master/slave acyclical C2) |
|---|---|
| INITIATE | Establish C2 connection |
| ABORT | Disconnect C2 connection |
| READ | Read data set |
| WRITE | Write data set |

### 9.1.5 DP-V1 alarm handling

In addition to the acyclical services, the DP-V1 specification also defines extended alarm handling. Alarm handling now distinguishes between different alarm types. As a result, unit-specific diagnostics cannot be evaluated in DP-V1 operation using the 'DDLM_SlaveDiag' DP-V0 service. DP-V1 alarm handling has not been defined for drive engineering as an inverter does not usually transfer its status information via cyclical process data communication.

## 9.2 Characteristics of SEW inverters

The SEW fieldbus interfaces to PROFIBUS DP-V1 have the same communication features for the DP-V1 interface. The drives are usually controlled via a C1 master with cyclical process data in accordance with the DP-V1 standard. This C1 master (usually a PLC) can also use an 8-byte MOVILINK® parameter channel during cyclical data exchange to perform the parameter services with DFS11B. The READ and WRITE services give the C1 master access to connected stations via the DP-V1 C1 channel.

Two additional C2 channels can be connected in parallel to these parameter channels. The first C2 master as a visualization device, for example could use these channels to read parameter data, and a second C2 master in the form of a notebook could use them to configure the drive using the MOVITOOLS® software.

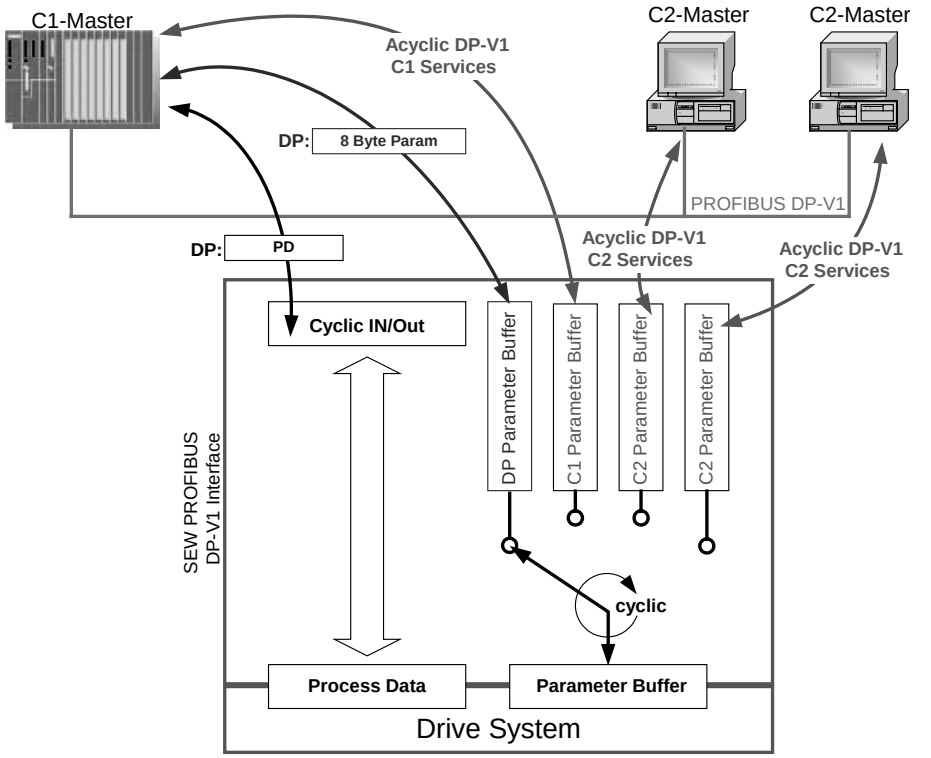



*Figure 12: Parameter setting channels for PROFIBUS DP-V1*

## 9.3 Structure of the DP-V1 parameter channel

Generally, the parameter setting of the drives to the PROFIdrive DP-V1 parameter channel of profile version 3.0 is implemented via data set 47. The *Request ID* entry is used to distinguish between parameter access based on PROFIdrive profile or via SEW-MOVILINK® services. The following table shows the possible codes of the individual elements. The data set structure is the same for PROFIdrive and MOVILINK® access.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The following MOVILINK® services are supported:

- 8-byte MOVILINK® parameter channel with all the services supported by the inverter such as
  - READ parameters
  - WRITE parameters
  - WRITE parameter volatile
  - etc.

The following PROFIdrive services are supported:

- Read (request parameter) individual parameters of the type *double word*
- Write (change parameter) individual parameters of the type *double word*

*Table 1: Elements of data set DS47*

| Field | Data type | Values |
|---|---|---|
| Request reference | Unsigned8 | 0x00 reserved<br>0x01 ... 0xFF |
| Request ID | Unsigned8 | 0x01 Request parameter (PROFIdrive)<br>0x02 Change parameter (PROFIdrive)<br>0x40 SEW MOVILINK® service |
| Response ID | Unsigned8 | Response (+):<br>0x00 reserved<br>0x01 Request parameter (+) (PROFIdrive)<br>0x02 Change parameter (+) (PROFIdrive)<br>**0x40 SEW MOVILINK® service (+)**<br><br>Response (–):<br>0x81 Request parameter (–) (PROFIdrive)<br>0x82 Change parameter (–) (PROFIdrive)<br>**0xC0 SEW MOVILINK® service (–)** |
| Axis | Unsigned8 | 0x00 ... 0xFF Number of axes 0 ... 255 |
| No. of parameters | Unsigned8 | 0x01 ... 0x13 1 ... 19 DWORDs (240 DP-V1 data bytes) |
| Attributes | Unsigned8 | 0x10 Value<br><br>**For SEW MOVILINK® (Request ID = 0x40):**<br>**0x00 No service**<br>**0x10 READ parameters**<br>**0x20 WRITE parameter**<br>**0x30 WRITE Parameter volatile**<br>**0x40 ... 0xF0 Reserved** |
| No. of elements | Unsigned8 | 0x00 for parameters that are not indexed<br>0x01 ... 0x75 Quantity 1 ... 117 |
| Parameter number | Unsigned16 | 0x0000 ... 0xFFFF MOVILINK® parameter index |
| Subindex | Unsigned16 | 0x0000 SEW: always 0 |
| Format | Unsigned8 | 0x43 Double word<br>0x44 Error |
| No. of values | Unsigned8 | 0x00 ... 0xEA Quantity 0 ... 234 |
| Error value | Unsigned16 | 0x0000 ... 0x0064 PROFIdrive error codes<br>0x0080 + MOVILINK®-Additional Code Low<br>**For SEW MOVILINK® 16 bit error value** |

### 9.3.1 Procedure for setting parameters via data set 47

Parameter access takes place with the combination of the DP-V1 services *WRITE* and *READ*. The parameter setting order is transferred to the slave using the *WRITE.req*, followed by slave-internal processing.

The master now sends a *READ.req* to pick up the parameter setting response. The master repeats the *READ.req* if the *READ.res* from the slave is negative. As soon as the parameter processing in the inverter is concluded, it answers with a positive response *READ.res*. The user data now contain the parameter setting response of the parameter setting order that was previously sent with *WRITE.req* (see the following figure). This mechanism applies to both a C1 and a C2 master.

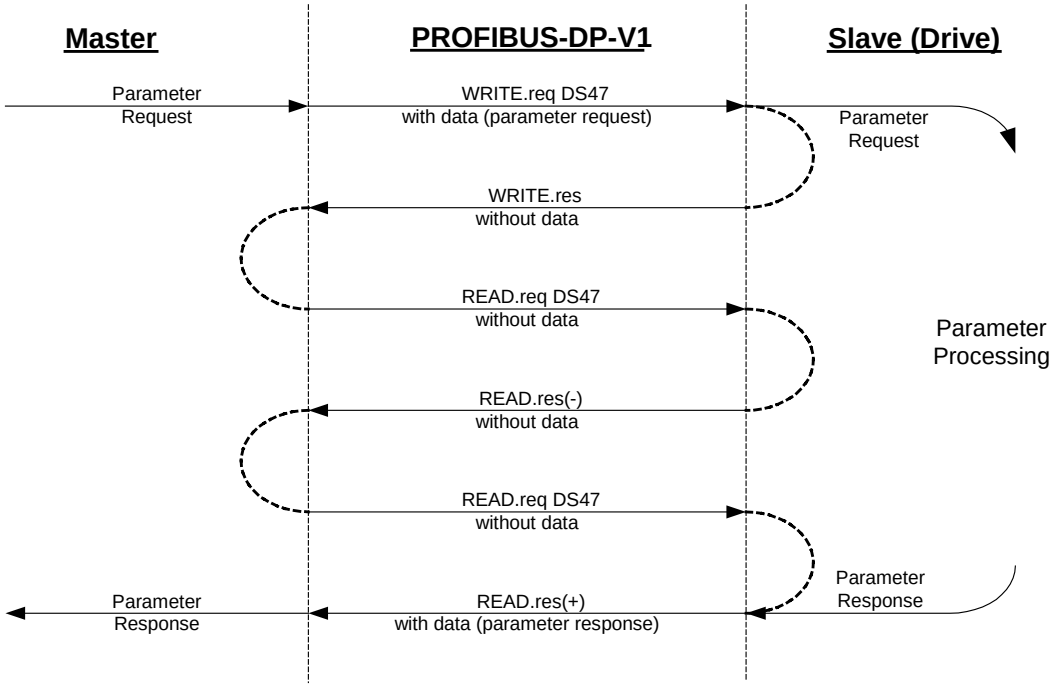


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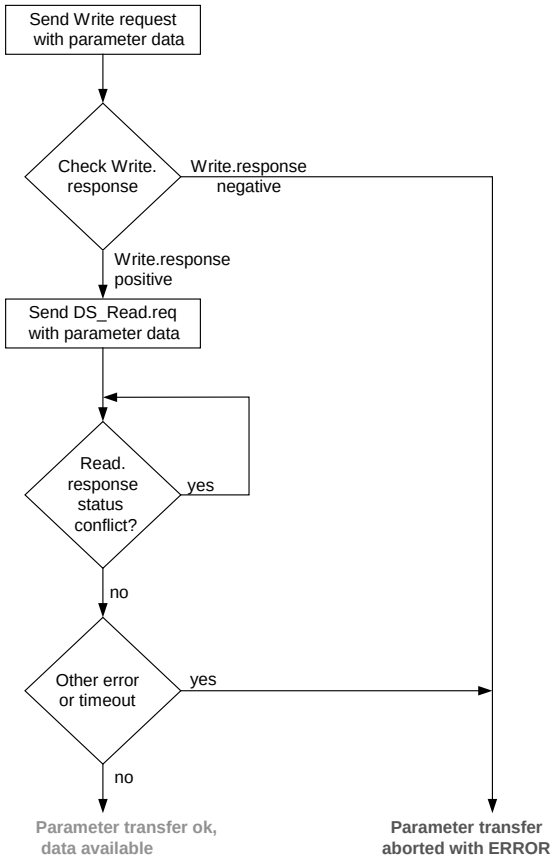
*Figure 13: Telegram sequence for parameter access via PROFIBUS DP-V1*

### 9.3.2 DP-V1 master processing sequence

If the bus cycles are very short, the request for the parameter response arrives before the inverter has concluded parameter access in the device. This means that the response data from the inverter is not yet available. In this case, the inverter sends a negative answer with the **Error_Code _1 = 0xB5 (status conflict)** to the DP-V1 level. The DP-V1 master must then repeat the request with the READ.req header until it receives a positive answer from the inverter.

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### 9.3.3 Addressing connected inverters

The structure of the DS47 data set defines an axis element. This element is used to reach multi-axis drives that are operated via one PROFIBUS interface. The axis element addresses one of the devices connected via the PROFIBUS interface. This mechanism can be used, for example, by the SEW MQP bus modules for MOVIMOT® or UFP for MOVITRAC® 07.

***Addressing a MOVIDRIVE® inverter at PROFIBUS DP-V1***

With the setting *Axis = 0*, the parameter of the drive inverters can be accessed directly. Since there are no drive devices connected to MOVIDRIVE®, access with *Axis > 0* is returned with an error code.

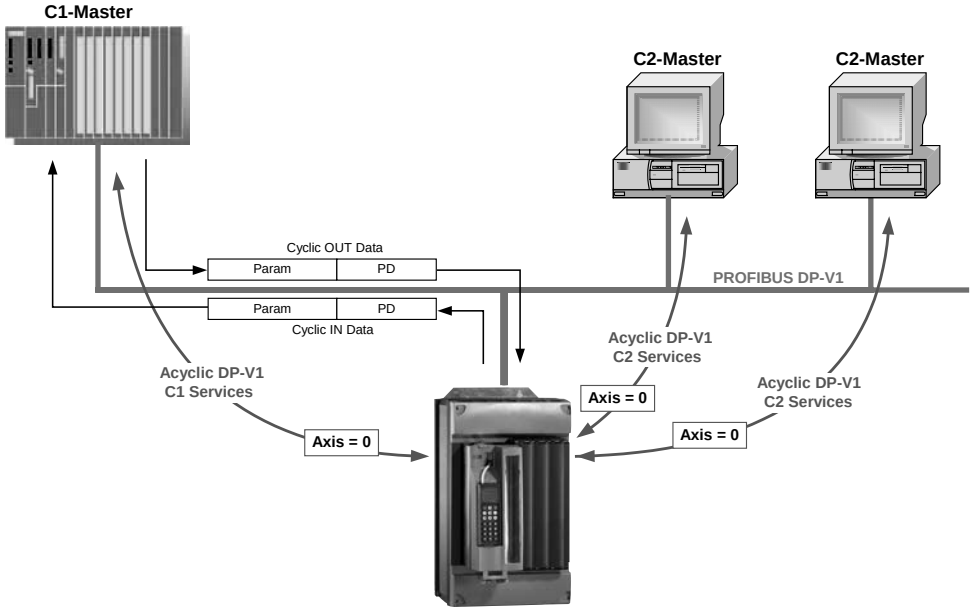


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*Figure 14: Addressing a MOVIDRIVE® inverter directly via PROFIBUS DP-V1 with Axis = 0.*

### 9.3.4 MOVILINK® parameter requests

The MOVILINK® parameter channel of the SEW inverter is directly mapped in the structure of data set 47. The Request ID 0x40 (SEW MOVILINK® service) is used for the exchange of MOVILINK® parameter setting orders. Parameter access with MOVILINK® services usually takes place according to the structure described below. The typical telegram sequence for data set 47 is used.

**Request ID: 0x40 SEW MOVILINK® service**

The actual service is defined by the data set element *Attribute* in the MOVILINK® parameter channel. The high nibble of this element corresponds to the service nibble in the management byte of the DP parameter channel.

***Example for reading a parameter via MOVILINK®***

The following tables show an example of the structure of the WRITE.request and READ.res user data for reading an individual parameter via the MOVILINK® parameter channel.

### Sending parameter request

The following table shows the coding of the user data for the *WRITE.req* service specifying the DP-V1 header. The *WRITE.req* service is used to transfer the parameter setting request to the inverter. The firmware version is read.

*Table 2: WRITE.request header for transferring the parameter request*

| Service: | WRITE.request | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 10 | 10 byte user data for parameter request |

*Table 3: WRITE.req USER DATA for MOVILINK ®"READ parameter"*

| Byte | Box | Value | Description |
|---|---|---|---|
| 0 | Request reference | 0x01 | Individual reference number for the parameter setting request is mirrored in the parameter response |
| 1 | Request ID | 0x40 | SEW MOVILINK® service |
| 2 | Axis | 0x00 | Axis number; 0 = single axis |
| 3 | No. of parameters | 0x01 | 1 parameter |
| 4 | Attributes | 0x10 | MOVILINK® service “READ parameter” |
| 5 | No. of elements | 0x00 | 0 = access to direct value, no subelement |
| 6, 7 | Parameter Number | 0x206C | MOVILINK® index 8300 = “firmware version” |
| 8, 9 | Subindex | 0x0000 | Subindex 0 |

### Query parameter response

The following table shows the coding of the READ.req USER DATA including the DP-V1 header.

*Table 4: READ.req for requesting the parameter response*

| Service: | READ.request | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 240 | Maximum length of response buffer in the DP-V1 master |

### Positive MOVILINK® parameter setting response

The table shows the READ.res USER DATA with the positive response data of the parameter setting request. The parameter value for index 8300 (firmware version) is returned as an example.

*Table 5: DP-V1 header of the positive READ.response with parameter response*

| Service: | READ.request | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 10 | 10 byte user data in response buffer |

*Table 6: Positive response for MOVILINK® service*

| Byte | Box | Value | Description |
|---|---|---|---|
| 0 | Response reference | 0x01 | Reflected reference number from the parameter setting order |
| 1 | Response ID | 0x40 | Positive MOVILINK® response |
| 2 | Axis | 0x00 | Reflected axis number; 0 = single axis |
| 3 | No. of parameters | 0x01 | 1 parameter |
| 4 | Format | 0x43 | Parameter format: Double word |
| 5 | No. of values | 0x01 | 1 value |
| 6, 7 | Value Hi | 0x311C | Higher-order part of the parameter |
| 8, 9 | Value Lo | 0x7289 | Lower-order part of the parameter |
| | | | Decoding:<br>0x 311C 7289 = 823947913 dec<br>>> firmware version 823 947 9.13 |

***Example for writing a parameter via MOVILINK®***

The following tables show the sequence of the *WRITE* and *READ* services for volatile writing of the value 12345 to IPOS$^{plus®}$ variable H0 (parameter index 11000) as an example. The MOVILINK® service *WRITE Parameter volatile* is used for this purpose.

### Send "WRITE parameter volatile" order

*Table 7: DP-V1 header of the WRITE.request with parameter request*

| Service: | WRITE.request | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 16 | 16 byte user data for order buffer |

*Table 8: WRITE.req user data for MOVILINK® service "WRITE parameter volatile"*

| Byte | Box | Value | Description |
|---|---|---|---|
| 0 | Request reference | 0x01 | Individual reference number for the parameter setting request is mirrored in the parameter response |
| 1 | Request ID | 0x40 | SEW MOVILINK® service |
| 2 | Axis | 0x00 | Axis number; 0 = single axis |
| 3 | No. of parameters | 0x01 | 1 parameter |
| 4 | Attributes | 0x30 | MOVILINK® service “WRITE parameter volatile” |
| 5 | No. of elements | 0x00 | 0 = access to direct value, no subelement |
| 6, 7 | Parameter Number | 0x2AF8 | Parameter index 11000 = "IPOS variable H0" |
| 8, 9 | Subindex | 0x0000 | Subindex 0 |
| 10 | Format | 0x43 | Double word |
| 11 | No. of values | 0x01 | Change 1 parameter value |
| 12, 13 | Value HiWord | 0x0000 | Higher-order part of the parameter value |
| 14, 15 | Value LoWord | 0x0BB8 | Lower-order part of the parameter value |

After sending this WRITE.request, the WRITE.response is received. If there was no status conflict in processing the parameter channel, a positive WRITE.response occurs. Otherwise, the status fault is located in Error_code_1.

### Query parameter response

The following table shows the coding of the WRITE.req USER DATA including the DP-V1 header.

*Table 9: READ.req for requesting the parameter response*

| Field | Value | Description |
|---|---|---|
| Function_Num | | READ.req |
| Slot_Number | X | Slot_Number not used |
| Index | 47 | Index of the data set |
| Length | 240 | Maximum length of response buffer in the DP master |

### Positive response to “WRITE parameter volatile”

*Table 10: DP-V1 header of the positive READ.response with parameter response*

| Service: | READ.response | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 4 | 4 byte user data in response buffer |

*Table 11: Positive response for MOVILINK® service „WRITE Parameter'*

| Byte | Field | Value | Description |
|---|---|---|---|
| 0 | Response reference | 0x01 | Reflected reference number from the parameter setting order |
| 1 | Response ID | 0x40 | Positive MOVILINK® response |
| 2 | Axis | 0x00 | Reflected axis number; 0 = single axis |
| 3 | No. of parameters | 0x01 | 1 parameter |

***Negative parameter response***

The following table shows the coding of a negative response of a MOVILINK® service. Bit 7 is entered in the the response ID if the response is negative.

*Table 12: Negative response for MOVILINK® service*

| Service: | READ.response | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 8 | 8 byte user data in response buffer |

| Byte | Field | Value | Description |
|---|---|---|---|
| 0 | Response reference | 0x01 | Reflected reference number from the parameter setting order |
| 1 | Response ID | 0xC0 | Negative MOVILINK® response |
| 2 | Axis | 0x00 | Reflected axis number; 0 = single axis |
| 3 | No. of parameters | 0x01 | 1 parameter |
| 4 | Format | 0x44 | Error |
| 5 | No. of values | 0x01 | 1 error code |
| 6, 7 | Error value | 0x0811 | MOVILINK® return code<br>e.g. Error class 0x08, Add. code 0x11<br>(see section "MOVILINK® configuration return codes for DP-V1" on page 97) |

### *MOVILINK® configuration return codes for DP-V1*

The following table shows the return codes that are returned by the SEW DP-V1 interface if an error occurs during DP-V1 parameter access.

| MOVILINK® Return codes (hex) | Description |
|---|---|
| 0x0810 | Invalid index, parameter index does not exist in the unit |
| 0x0811 | Function/parameter not implemented |
| 0x0812 | Read access only |
| 0x0813 | Parameter lock activated |
| 0x0814 | Factory setting is active |
| 0x0815 | Value for parameter too large |
| 0x0816 | Value for parameter too small |
| 0x0817 | Required option card not installed |
| 0x0818 | Error in system software |
| 0x0819 | Parameter access via RS-485 process interface only |
| 0x081A | Parameter access via RS-485 diagnostic interface only |
| 0x081B | Parameter is access-protected |
| 0x081C | Controller inhibit is required |
| 0x081D | Invalid value for parameter |
| 0x081E | Factory setting was activated |
| 0x081F | Parameter was not saved in EEPROM |
| 0x0820 | Parameter cannot be changed with output stage enabled / reserved |
| 0x0821 | Reserved |
| 0x0822 | Reserved |
| 0x0823 | Parameter may only be changed at IPOS program stop |
| 0x0824 | Parameter may only be changed when auto setup is deactivated |
| 0x0505 | Incorrect coding of management and reserved byte |
| 0x0602 | Communication error between inverter system and fieldbus interface |
| 0x0502 | Timeout of secondary connection (e.g. during reset or with Sys-Fault) |

### 9.3.5 PROFIdrive parameter orders

The PROFIdrive parameter channel of SEW inverters is directly mapped in the structure of data set 47. Parameter access with PROFIdrive services usually takes place according to the structure described below. The typical telegram sequence for data set 47 is used. PROFIdrive only defines the two request IDs

**Request ID:0x01request parameter (PROFIdrive)**

**Request ID:0x02change parameter (PROFIdrive)**

This means there is restricted data access in comparison with the MOVILINK® services.

The request ID = 0x02 = Change Parameter (PROFIdrive) results in remanent write access to the selected parameter. Consequently, the internal flash EEPROM of the inverter is written with each write access. Use the MOVILINK® service "WRITE Parameter volatile“ if parameters must be written cyclically at short intervals. With this service, you only alter the parameter values in the RAM of the inverter.

***Example for reading a parameter via PROFIdrive***

The following tables show an example of the structure of the WRITE.request and READ.res user data for reading an individual parameter via the MOVILINK® parameter channel.

#### Sending parameter request

The following table shows the coding of the user data for the WRITE.req service specifying the DP-V1 header. The WRITE.req service is used to transfer the parameter setting request to the inverter.

*Table 13: WRITE.request header for transferring the parameter request*

| Service: | WRITE.request | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 10 | 10 byte user data for parameter request |

*Table 14: WRITE.req USER DATA for PROFIdrive "Request parameter"*

| Byte | Field | Value | Description |
|---|---|---|---|
| 0 | Request reference | 0x01 | Individual reference number for the parameter setting request is mirrored in the parameter response |
| 1 | Request ID | 0x01 | Request parameter (PROFIdrive) |
| 2 | Axis | 0x00 | Axis number; 0 = single axis |
| 3 | No. of parameters | 0x01 | 1 parameter |
| 4 | Attributes | 0x10 | Access to parameter value |
| 5 | No. of elements | 0x00 | 0 = access to direct value, no subelement |
| 6, 7 | Parameter Number | 0x206C | MOVILINK® index 8300 = “firmware version” |
| 8, 9 | Subindex | 0x0000 | Subindex 0 |

### Query parameter response

The following table shows the coding of the READ.req USER DATA including the DP-V1 header.

*Table 15: READ.req for requesting the parameter response*

| Service: | READ.request | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 240 | Maximum length of response buffer in the DP-V1 master |

### Positive PROFIdrive parameter response

The table shows the READ.res user data with the positive response data of the parameter setting request. The parameter value for index 8300 (firmware version) is returned as an example.

*Table 16: DP-V1 header of the positive READ.response with parameter response*

| Service: | READ.request | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 10 | 10 byte user data in response buffer |

*Table 17: Positive response for MOVILINK® service*

| Byte | Field | Value | Description |
|---|---|---|---|
| 0 | Response reference | 0x01 | Reflected reference number from the parameter setting order |
| 1 | Response ID | 0x01 | Positive response for "Request Parameter“ |
| 2 | Axis | 0x00 | Reflected axis number; 0 = single axis |
| 3 | No. of parameters | 0x01 | 1 parameter |
| 4 | Format | 0x43 | Parameter format: Double word |
| 5 | No. of values | 0x01 | 1 value |
| 6, 7 | Value Hi | 0x311C | Higher-order part of the parameter |
| 8, 9 | Value Lo | 0x7289 | Lower-order part of the parameter |
| | | | Decoding:<br>0x 311C 7289 = 823947913 dec<br>>> firmware version 823 947 9.13 |

***Example for writing a parameter via PROFIdrive***

The following tables show an example of the structure of the *WRITE* and *READ* services for the **remanent** writing of the internal setpoint n11 (see section "Example for writing a parameter via MOVILINK®" on page 95). The PROFIdrive service *change parameter* is used for this purpose.

### Send "WRITE parameter " request

*Table 18: DP-V1 header of the WRITE.request with parameter request*

| Service: | WRITE.request | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 16 | 16 byte user data for order buffer |

*Table 19: WRITE.req user data for PROFIdrive service "change parameter"*

| Byte | Field | Value | Description |
|---|---|---|---|
| 0 | Request reference | 0x01 | Individual reference number for the parameter setting request is mirrored in the parameter response |
| 1 | Request ID | 0x02 | Change parameter (PROFIdrive) |
| 2 | Axis | 0x01 | Axis number; 0 = single axis |
| 3 | No. of parameters | 0x01 | 1 parameter |
| 4 | Attributes | 0x10 | Access to parameter value |
| 5 | No. of elements | 0x00 | 0 = access to direct value, no subelement |
| 6, 7 | Parameter Number | 0x7129 | Parameter index 8489 = P160 n11 |
| 8, 9 | Subindex | 0x0000 | Subindex 0 |
| 10 | Format | 0x43 | Double word |
| 11 | No. of values | 0x01 | Change 1 parameter value |
| 12, 13 | Value HiWord | 0x0000 | Higher-order part of the parameter value |
| 14, 15 | Value LoWord | 0x0BB8 | Lower-order part of the parameter value |

After sending this WRITE.request, the WRITE.response is received. If there was no status conflict in processing the parameter channel, a positive WRITE.response occurs. Otherwise, the status fault is located in Error_code_1.

### Query parameter response

The following table shows the coding of the WRITE.req user data including the DP-V1 header.

*Table 20: READ.req for requesting the parameter response*

| Field | Value | Description |
|---|---|---|
| Function_Num | | READ.req |
| Slot_Number | X | Slot_Number not used |
| Index | 47 | Index of the data set |
| Length | 240 | Maximum length of response buffer in the DP-V1 master |

### Positive response to '"RITE parameter"

*Table 21: DP-V1 header of the positive READ.response with parameter response*

| Service: | READ.response | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 4 | 4 byte user data in response buffer |

*Table 22: Positive response for PROFIdrive service "Change parameter"*

| Byte | Field | Value | Description |
|---|---|---|---|
| 0 | Response reference | 0x01 | Reflected reference number from the parameter setting order |
| 1 | Response ID | 0x02 | Positive PROFIdrive response |
| 2 | Axis | 0x01 | Reflected axis number; 0 = single axis |
| 3 | No. of parameters | 0x01 | 1 parameter |

***Negative parameter response***

The following table shows the coding of a negative response of a PROFIdrive service. Bit 7 is entered in the response ID if the response is negative.

*Table 23: Negative response for PROFdrive service*

| Service: | READ.response | Description |
|---|---|---|
| Slot_Number | 0 | Random, (is not evaluated) |
| Index | 47 | Index of the data set; constant index 47 |
| Length | 8 | 8-byte user data in response buffer |

| Byte | Field | Value | Description |
|---|---|---|---|
| 0 | Response reference | 0x01 | Reflected reference number from the parameter setting request |
| 1 | Response ID | 0x810x82 | Negative response for “Request Parameter” Negative response for “Change Parameter” |
| 2 | Axis | 0x00 | Reflected axis number; 0 = single axis |
| 3 | No. of parameters | 0x01 | 1 parameter |
| 4 | Format | 0x44 | Error |
| 5 | No. of values | 0x01 | 1 error code |
| 6, 7 | Error value | 0x0811 | MOVILINK® return code<br>e.g. Error class 0x08, Add. code 0x11<br>(see section "MOVILINK® configuration return codes for DP-V1" on page 97) |

***PROFIdrive return codes for DP-V1***

The following table shows the coding of the error number in the PROFIdrive DP-V1 parameter response according to PROFIdrive profile V3.1. This table applies if you use the PROFIdrive services "Request Parameter" and/or "Change Parameter".

| Error no. | Meaning | Used for |
|---|---|---|
| 0x00 | Invalid parameter number. | Access to non-existent parameters |
| 0x01 | Parameter value cannot be changed | An attempt was made to change a parameter value that cannot be changed |
| 0x02 | Minimum or maximum value exceeded | An attempt was made to change a value to one that is outside of the limit values |
| 0x03 | Incorrect subindex | Access to non-existent subindex |
| 0x04 | No assignment | Access with subindex to parameter that is not indexed |
| 0x05 | Incorrect data type | An attempt was made to change a replace a value with one that does not correspond to the data type of the parameter |
| 0x06 | Setting not permitted (can only be reset) | An attempt was made to set a value to one larger than 0 where this is not permitted |
| 0x07 | Description element cannot be changed | Access to description element that cannot be changed |
| 0x08 | Reserved | (PROFIdrive Profile V2: PPO write query for IR not available) |
| 0x09 | Description does not exist | Access to description that is not accessible (parameter value exists) |
| 0x0A | Reserved | (PROFIdrive Profile V2: incorrect access group) |
| 0x0B | No operation priority | An attempt was made to change a parameter without change rights |
| 0x0C | Reserved | (PROFIdrive Profile V2: incorrect password) |
| 0x0D | Reserved | (PROFIdrive Profile V2: text cannot be read in cyclic data transfer) |
| 0x0E | Reserved | (PROFIdrive Profile V2: name cannot be read in cyclic data transfer) |
| 0x0F | No text assignment available | Access to text assignment that is not accessible (parameter value exists) |
| 0x10 | Reserved | (PROFIdrive Profile V2: no PPO write) |
| 0x11 | Request cannot be executed due to the operating mode | Access is currently not possible and the reason is not explained |
| 0x12 | Reserved | (PROFIdrive Profile V2: other error) |
| 0x13 | Reserved | (PROFIdrive Profile V2: data cannot be read in cyclic exchange) |
| 0x14 | Illegal value | An attempt was made to change a value to one that is in the permitted range but is not permitted due to other long-term reasons (parameter with specified individual values) |
| 0x15 | Response is too long | The length of the current response exceeds the maximum transmittable length |
| 0x16 | Invalid parameter address | Invalid value or value that is not valid for this attribute, number of elements, parameter number, subindex or a combination of these factors. |
| 0x17 | Incorrect format | Write request: Invalid format or parameter data format that is not supported |
| 0x18 | Number of values is not consistent | Write request: Number of values of parameter data does not correspond to the number of elements in the parameter address |
| 0x19 | Axis does not exist | Access to an axis that does not exist |
| up to 0x64 | Reserved | – |
| 0x65..0xFF | Depends on the manufacturer | – |

## 9.4 Configuring a C1 master

A special GSD file *SEW_600C.GSD* is required for configuring a DP-V1 C1 master. This file activates the DP-V1 functions of the DFS11B. The functions of the GSD file and the DFS11B firmware must correspond with one another. When you implement the DP-V1 functions, SEW-EURODRIVE provides you with two GSD files (see page 36 for PROFIBUS DP-V1 and page 41 for MOVITRAC® B and gateway housing UOH11B).

### 9.4.1 Operating mode (DP-V1 mode)

The DP-V1 operating mode can usually be activated for configuring a C1 master. All DP slaves, which have the DP-V1 functions enabled in their GSD files and which support DP-V1, will then be operated in DP-V1 mode. Standard DP slaves will still run via PROFIBUS DP. This ensures mixed mode for DP-V1 and DP-capable modules. Depending on the master functionality, a DP-V1 capable station, that was configured using the DP-V1 GSD file, can run in the "DP" operating mode.

### 9.4.2 Example program for SIMATIC S7

The STEP 7 code stored in the GSD file shows how parameters are accessed via the STEP 7 system function modules SFB 52/53. You can copy the STEP 7 code and import/compile it as a STEP 7 source.

This example is a special and free service that demonstrates only the basic approach to generating a PLC program as a non-binding sample. We are not liable for the contents of the example program.

***Example: Function module FB5 'DPV1_Movilink_FB'***

```
FUNCTION_BLOCK FB 5
TITLE =DPV1_Movilink_FB
//NOTE!
//This example program only demonstrates the basic approach.
//Neither legal nor any kind of liability can be inferred
//from faulty program functions and the consequences thereof.
//
//System requirements:
// - DP master connection of the S7-300 or S7-400 families
// which support the DPV1 master functions.
// - DPV1 Profibus connections from SEW (identifier 'SEWA600x.GSD')
//
//This function module is used to exchange parameters between inverters
//and PLC via the DPV1 channel. As the data exchange via the
//DPV1 parameter channel is an acyclical service, the
//function module has to be called until data exchange has been completed
//(duration from triggering a parameter request via fActivate up to
//feedback from fDone).
AUTHOR : SEW
FAMILY : Movilink
VERSION : 0.1

VAR_INPUT
  Drive_IO_Address : INT ;  //Periphery address of the inverter
  bService : BYTE ; //Movilink service byte 0x01 = READ, 0x02 = WRITE, etc.
  bAxis : BYTE ;    //0 for single axis, subaddress of the axis when using UFP11A
  wParameterIndex : WORD ;  //Movilink ParameterIndex
  wSubIndex : WORD ;    //Movilink subindex
  dwWRITEData : DWORD ; //WRITE data
  InstanzDB_SFB52 : BLOCK_DB ;  //InstanzDB of the system function SFB52. Is required for DPV1_READ
  InstanzDB_SFB53 : BLOCK_DB ;  //InstanzDB of the system function SFB53. Is required for DPV1_WRITE
END_VAR

VAR_OUTPUT
  bError : BYTE ;   //No error = 0, S7 error = 1, TimeOut = 2, Movilink error = 3;
  dwData : DWORD ;  //Contains data if fError=0; S7-ErrorCode if fError=1; else not defined
END_VAR

VAR_IN_OUT
  fActivate : BOOL ;    //Triggering the function
  fBusy : BOOL ;    //Busy bit. TRUE until the function is finished or timeout monitoring responds
  fDone : BOOL ;    //Indicates that the function is finished (with or without error)
END_VAR

VAR
  fStaticBusy : BOOL ;  //Storage bit for busy flag
  fStaticWRITEReq : BOOL ;  //When MVLK WRITEReq = TRUE or MVLK READReq = FALSE
  fDPV1WRITEDone : BOOL ;   //Indicates whether DPV1 WRITE was performed
  fAuxflag : BOOL ;
  dwStaticDriveAddr : DWORD ;   //I/O address of the inverter
  iStaticReqLength : INT ; //Length of the telegrams to be transmitted
  MVLK_Req : STRUCT     //Movilink structure WRITERequest
   RequestReference : BYTE  := B#16#1;  //REQ: Request reference
   RequestId : BYTE  := B#16#40;    //REQ: Request ID
   Axis : BYTE ;    //REQ: Axis
   No_of_Parameter : BYTE  := B#16#1;  //REQ: No. of parameters
   Attributes: BYTE ;    //REQ: Attributes
   No_of_Elements : BYTE ;    //REQ: No of Elements
   ParameterNumber : WORD ; //REQ: Parameter number
   Subindex : WORD ; //REQ: Subindex
   Format: BYTE  := B#16#43;
   Values : BYTE  := B#16#1;
   WRITEData : DWORD ;  //REQ: WRITEData
  END_STRUCT ;
  TimeoutCounter : WORD ;   //Timeout counter
END_VAR
```

```
VAR_TEMP
  MVLK_Resp : STRUCT    //Movilink structure Response
   ResponseReference : BYTE ;   //RESP: Response reference
   ResponseId : BYTE ;   //RESP: Response ID
   Axis : BYTE ;   //RESP: Axis
   No_of_Parameter : BYTE ;   //RESP: No. of parameters
   Attachment : ARRAY  [0 .. 7 ] OF //REQ: Data
   BYTE ;
  END_STRUCT ;
  fTempError : BOOL ;
  fTempBusy : BOOL ;
  fTempDone : BOOL ;
  fTempValid : BOOL ;
  dwTempStatus : DWORD ;
END_VAR

BEGIN
NETWORK
TITLE =Insert transfer parameter in Movilink structure

 U     #fActivate;
       FP    #fAuxflag; //If neither a parameter service is triggered
       O     #fBusy; //...nor processed,
       SPBN  END; //...then the function is ended
       U     #fStaticBusy; //If static busy is set, WRITE service has already been performed,
       SPBN  NEWR; //then go to new request
       U     #fDPV1WriteDone; //If WRITE service was finished without error, go to READ
       SPB   READ;
       SPA   WRIT; //Else go to WRITE
NEWR:  NOP   0; //Initialization:
       UN    #fStaticBusy; //Output bits and values are reset
       S #fStaticBusy; //Busy output and flag bit are set
       S     #fBusy;
       R     #fDone; //DoneBit is reset
       L     0;
       T     #bError; //Error and data output values are set to ZERO
       T     #dwData;
       L     #Drive_IO_Address; //Convert drive address from Int to DWord
       T     #dwStaticDriveAddr;

//Bring data into Movilink structure (only the variable values of the structure are supplied with the input param-
eters here)
       L     #bAxis;
       T     #MVLK_Req.Axis;
       L     #bService; //Service byte is multiplied by 10 hex
       SLW 4;
       T     #MVLK_Req.Attribute;
       L     #bService;
       SPL ERUI; //Go to error MVLK service
       SPA   ERUI; // 0x00 No service
       SPA   ZEHN; // 0x01 READ parameter
       SPA   SEXZ; // 0x02 WRITE parameter
       SPA   SEXZ; // 0x03 WRITE Parameter volatile
       SPA   ZEHN; // 0x04 READ Min
       SPA   ZEHN; // 0x05 READ Max
       SPA   ZEHN; // 0x06 READ Default
       SPA   ZEHN; // 0x07 READ Scale
       SPA   ZEHN; // 0x08 READ Attribute
       SPA   ZEHN; // 0x09 READ EEPROM

ERUI:  NOP   0; // Error illegal MVLK service
       L     3; //Movilink error
       T     #bError;
       L     DW#16#501; //MLER_ILLEGAL_SERVICE
       SET   ;
       S     #fDone; //Busy and done bits are reset
       R     #fBusy;
       R     #fStaticBusy;
       R     #fDPV1WRITEDone;
       BEA   ; //End function

SEXZ:  NOP   0;
       SET   ;
       S     #fStaticWriteReq; //Indication for data evaluation that request was a MVLK WRITE request
       L     16;
       SPA   LEN; //Go to defined length

ZEHN:  NOP   0;
       SET   ;
       R     #fStaticWRITEReq; //Indication for data evaluation that request was a MVLK READ request
       L     10;

LEN:   NOP   0;
       T     #iStaticReqLength;
       L     #wParameterIndex;
       T     #MVLK_Req.ParameterNumber;
       L     #wSubIndex;
       T #MVLK_Req.Subindex;
       L     #dwWRITEData; //Data is written to the structure disregarding whether write or read access
       T     #MVLK_Req.WRITEData;
```

```
NETWORK
TITLE =WRITE service
//To transfer the parameter requirement to the inverter, an SFB53 call
//(DPV1WRITE service) must be executed.
WRIT: NOP   0;
      CALL SFB   53 , #InstanzDB_SFB53 (
           REQ                    := TRUE,
           ID                     := #dwStaticDriveAddr,
           INDEX                  := 47,//Data set 47
           LEN                    := #iStaticReqLength,
           DONE                   := #fTempDone,
           BUSY                   := #fTempBusy,
           ERROR                  := #fTempError,
           STATUS                 := #dwTempStatus,
           RECORD                 := #MVLK_Req);

//Evaluation of return values
      U     #fTempBusy; //The FB is exited and the busy bit set if the function is not finished
      SPB   ENDB;
      U     #fTempError; //If no error has occurred, go to read preparation
      SPBN  RD_V;
      SET   ; //An error has occurred ! Set error bit and reset busy bits
      R     #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WRITEDone;
      S     #fDone;
      L     1; //Issue error code 1 (S7 error)
      T     #bError;
      L     #dwTempStatus; //Return the S7 error code
      T     #dwData;
      BEA   ;
RD_V: NOP   0; //DPV1 read service is prepared
      SET   ;
      S     #fDPV1WRITEDone;

NETWORK
TITLE =READ service
//To fetch the parameter response from the inverter, SFB52
//(DPV1READ service) must be executed.
READ: NOP   0;
      CALL SFB   52 , #InstanzDB_SFB52 (
           REQ                    := TRUE,
           ID                     := #dwStaticDriveAddr,
           INDEX                  := 47,//Data set 47
           MLEN                   := 12,
           VALID                  := #fTempValid,
           BUSY                   := #fTempBusy,
           ERROR                  := #fTempError,
           STATUS                 := #dwTempStatus,
           LEN                    := #iStaticReqLength,
           RECORD                 := #MVLK_Resp);

//Evaluation of return values
      U     #fTempBusy; //The function module is exited and the busy bit set if the function is not finished.
      SPB   ENDB;
      U     #fTempError; //If no error has occurred, go to data evaluation
      SPBN  DATA;
      L     #TimeoutCounter; //TimeoutCounter is increased
      L     1;
      +I    ;
      T     #TimeoutCounter;
      L     #TimeoutCounter; //A timeout error is triggered when the timeout counter has reached 300
      L     300;
      >=I   ;
      SPB   TOUT;
//If error xx80B5xx hex (state conflict) is reported, then another parameter order already exists and the read
operation must be repeated

 L     #dwTempStatus;
      UD    DW#16#FFFF00;
      L     DW#16#80B500;
      ==D   ;
      SPBN  ERR;
      NOP   0;
      SPA   ENDB;

ERR:  SET   ; //An error has occurred ! Set error bit and reset busy bits
      R     #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WRITEDone;
      S     #fDone;
      L     1; //Issue error code 1 (S7 error)
      T     #bError;
      L     #dwTempStatus; //Return the S7 error code
      T     #dwData;
      L     0;
      T     #TimeoutCounter; //Reset timeout counter
      BEA   ;
```

```
DATA: NOP   0; //Data evaluation (first selection; positive or negative response)
      L     #MVLK_Resp.ResponseId;
      L     B#16#40; //positive Movilink response ?
      ==I   ;
      SPB   POSR; //go to positive response
      L     #MVLK_Resp.ResponseId;
      L     B#16#C0; //negative Movilink response ?
      ==I   ;
      SPB   NEGR; //go to negative response
      SET   ; //illegal Movilink response
      S     #fDone;
      R     #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WRITEDone;
      L     3; //Movilink error
      T     #bError;
      L     DW#16#502; //MLER_NO_RESPONSE
      T     #dwData;
      L     0;
      T     #TimeoutCounter; //Reset timeout counter
      BEA   ; //End function

TOUT: NOP   0; //Timeout
      L     2; //Movilink error
      T     #bError;
      L     0;
      T     #dwData;
      T     #TimeoutCounter; //Reset timeout counter
      SET   ; //The function is finished:
      S     #fDone; //=> set done,..reset busy
      R     #fActivate;
      R     #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WRITEDone;
      BEA   ;
NETWORK
TITLE =Evaluation of the parameter data

POSR: NOP   0;
      U     #fStaticWRITEReq;
      SPB   WRR; //go to WRITERequestResponse
// //READRequest was performed
      L     #MVLK_Resp.Attachment[2]; //Received data are written to output parameters
      SLD   24;
      L     #MVLK_Resp.Attachment[3];
      SLD   16;
      +D    ;
      L     #MVLK_Resp.Attachment[4];
      SLD   8;
      +D    ;
      L     #MVLK_Resp.Attachment[5];
      +D    ;
      T     #dwData;
      L     0; //no error
      T     #bError;
      SET   ; //The function is finished:
      S     #fDone; //=> Set done, fActiveate,... reset
      R     #fActivate;
      R     #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WRITEDone;
      L     0;
      T     #TimeoutCounter; //Reset timeout counter
      BEA   ;

WRR:  NOP   0;
// //WRITERequest was performed
      L     0; //Output parameter is filled with ZEROS
      T     #dwData;
      L     0; //no error
      T     #bError;
      SET   ; //Clear error bits
      S     #fDone;
      R     #fActivate;
      R     #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WRITEDone;
      L     0;
      T     #TimeoutCounter; //Reset timeout counter
      BEA   ;
```

```
NEGR: NOP   0;
      L     3; //Movilink error
      T     #bError;
      L     #MVLK_Resp.Attachment[2]; //Write error code to output parameter
      SLW 8;
      L     #MVLK_Resp.Attachment[3];
      +I    ;
      T     #dwData;
      SET   ; //The function is finished:
      S     #fDone; //=> set done,..reset busy
      R     #fActivate;
      R     #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WRITEDone;
      L     0;
      T     #TimeoutCounter; //Reset timeout counter
      BEA   ;

ENDB: SET   ; //Busy end
      S     #fBusy;
END:  NOP   0;
END_FUNCTION_BLOCK
```

***Example for calling FB5 "DPV1_Movilink_FB"***

Insert these lines into your cyclical S7 program to call the function module.

```
FUNCTION FC 1 : VOID
TITLE =Operation of the _DPV1 parameter channel
//This example program only demonstrates the basic approach.
//Neither legal nor any kind of liability can be inferred
//from faulty program functions and the consequences thereof.
VERSION : 0.1

BEGIN
NETWORK
TITLE =Writing a MOVITRAC® B parameter
//In this example, the internal setpoint n11 (P160) is written volatile with the value
//123 rpm.  The parameter service can be triggered by a positive edge at
//M100.0 (variable table "MC07").
//
//The parameter service addresses the MC07 with SBUS address 2.
//
//PROFIBUS address 9
//Per. addr. 512
// I
          DFS11A           MC07_1 MC07_2
// I_________________I_________________I
// SBUS addr.0     SBUS addr.1     SBUS addr. 2
//
//
//Note on hardware configuration:
//The periphery addresses ("PIW address" and "POW address") of the UFP11A must have the same
//value to being able to define the input "Drive_IO_Address"
//unambiguously.
//
//

 L     L#123000; //convert the parameter value from DINT..
       T     MD 110; //... to DWORD
//Conversion factor/value range of the parameter value: see parameter list in the "MC07 Communication" manual

 CALL FB     5 , DB     5 (
            Drive_IO_Address         := 512,
            bService                 := B#16#3,//0x01 = read, 0x02 = write, 0x03 = write volatile
            bAxis                    := B#16#2,//MC07 with SBUS addr. 2
            wParameterIndex := W#16#2129,//MOVILINK parameter index 8489d = P160, internal setpoint n11
            wSubIndex                := W#16#0,//MOVILINK subindex = 0
            dwWRITEData              := MD   110,//Parameter value that is written
            InstanzDB_SFB52          := DB   201,//InstanzDB for SFB52, is required for DPV1_READ
            InstanzDB_SFB53          := DB   202,//InstanzDB for SFB53, is required for DPV1_WRITE
            bError                   := MB   118,//no error = 0; S7 error = 1, Timeout = 2, MOVILINK error = 3
            dwData                   := MD   114,//bError = 0 => parameter value that was read; bError = 1 => S7
error code
            fActivate                := M    100.0,//Activation bit: Triggering a parameter request
            fBusy                    := M    100.1,//The parameter request is being processed or a timeout has
occurred
            fDone                    := M    100.2);//Parameter request is done

END_FUNCTION
```

### 9.4.3 Technical data DP-V1 for MOVIDRIVE® DFS11B

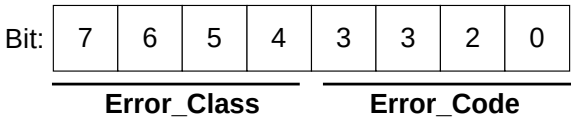
| GSD file for DP-V1: | SEW_600C.GSD |
|---|---|
| Module name for project planning: | MOVIDRIVE DFS11 (DP-V1) |
| Number of parallel C2 connections: | 2 |
| Supported data set: | Index 47 |
| Supported slot number: | Recommended: 0 |
| Manufacturer code: | 10A hex (SEW-EURODRIVE) |
| Profile ID: | 0 |
| C2 response timeout | 1 s |
| Max. length C1 channel: | 240 byte |
| Max. length C2 channel: | 240 byte |

### 9.4.4 Technical data DP-V1 for the gateway operation and MOVITRAC®

| GSD file for DP-V1: | SEW_6009.GSD |
|---|---|
| Module name for project planning: | Gateway DFP / DFS |
| Number of parallel C2 connections: | 2 |
| Supported data set: | Index 47 |
| Supported slot number: | Recommended: 0 |
| Manufacturer code: | 10A hex (SEW-EURODRIVE) |
| Profile ID: | 0 |
| C2 response timeout | 1 s |
| Max. length C1 channel: | 240 byte |
| Max. length C2 channel: | 240 byte |

### 9.4.5 Error codes of the DP-V1 services

This table shows possible error codes of DP-V1 services that may occur in the event of an error in the communication on DP-V1 telegram level. This table is relevant if you want to write your own parameter assignment block based on the DP-V1 services because the error codes are reported directly back on the telegram level.

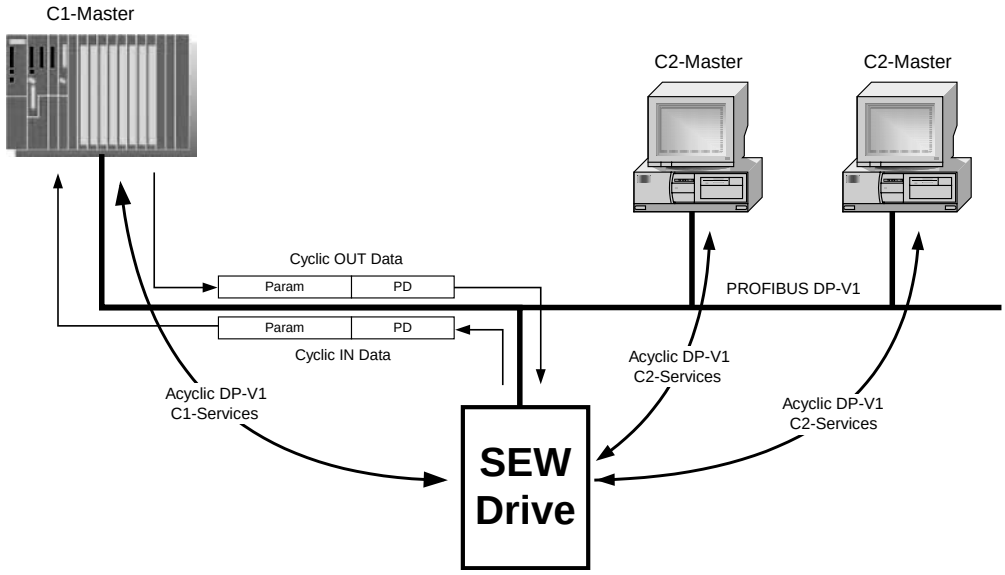



| Error_Class (from DP-V1 specification) | Error_Class (from DP-V1 specification) | DP-V1 parameter channel |
|---|---|---|
| 0x0 ... 0x9 hex = reserved | | |
| 0xA = application | 0x0 = read error<br>0x1 = write error<br>0x2 = module failure<br>0x3 to 0x7 = reserved<br>0x8 = version conflict<br>0x9 = feature not supported<br>0xA to 0xF = user specific | |
| 0xB = access | 0x0 = invalid index | 0xB0 = No data block Index 47 (DB47); parameter requests are not supported |
| | 0x1 = write length error<br>0x2 = invalid slot<br>0x3 = type conflict<br>0x4 = invalid area | |
| | 0x5 = state conflict | 0xB5 = Access to DB 47 temporarily not possible due to internal processing status |
| | 0x6 = access denied | |
| | 0x7 = invalid range | 0xB7 = WRITE DB 47 with error in the DB 47 header |
| | 0x8 = invalid parameter<br>0x9 = invalid type<br>0xA to 0xF = user specific | |
| 0xC = resource | 0x0 = read constraint conflict<br>0x1 = write constraint conflict<br>0x2 = resource busy<br>0x3 = resource unavailable<br>0x4..0x7 = reserved<br>0x8..0xF = user specific | |
| 0xD...0xF = user specific | | |

# 10 Operating MOVITOOLS® MotionStudio via PROFIBUS

## *10.1 Introduction*

PROFIBUS DP-V1 provides the user with acyclical parameter services in addition to cyclical process data. These acyclic parameter services can be used by the control system (class 1 or C1 master) as well as by other diagnostics and visualization devices (class 2 or C2 master).

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"MOVITOOLS® via PROFIBUS DP-V1" makes use of the features of the C2 master.

There are two configuration variants:

| | |
|---|---|
| Access via Softnet-DP driver | The Softnet-DP driver from Siemens is installed on the diagnostics PC. A connection to the drive can then be established by means of acyclical C2 services and MOVITOOLS® can be used online.<br>This configuration variant is independent of the C1 master. For example, a connection can even be established if the C1 master has failed.<br>How to configure the SIMATIC Net is described on page 75 . |
| Access via STEP 7 | A PG/PC PROFIBUS connection is configured and transferred to the programmable controller in NetPro / SIMATIC STEP 7. If STEP 7 version 5.3 SP3 is installed on your PC, the Softnet driver need not be installed on the diagnostics PC. |

## 10.2 Required hardware

Siemens PROFIBUS master card (CP5512, CP5611)

| | | |
|---|---|---|
| 6GK1561-1AA00 | SIMATIC NET CP5611 PCI card | PCI card for PCs |
| 6GK1551-2AA00 | SIMATIC NET CP5512<br>PCMCIA card | PCMCIA card for notebook<br>32-bit cardbus |

## 10.3 Required software

- STEP 7 version 5.3, SP3 or later

  **or**

- Softnet DP PC driver for PROFIBUS DP, Siemens from version 6.0 onward

| | | |
|---|---|---|
| 6GK1704-5DW61-3AA0 | SIMATIC NET PB Softnet-DP 6.1 | Driver package for WinNT 4.0, Win2k |

- MOVITOOLS® MotionStudio version 5.20 and higher

## 10.4 Installation

- Install the PROFIBUS master card into the diagnostics PC and install the driver according to the manufacturer's specifications.
- Install MOVITOOLS® MotionStudio.

## 10.5 Configuring SIMATIC NET

- Open the window 'Set PG-PC interface' from the start menu [SIMATIC] / [SIMATIC NET] / [Settings] or from the Windows system control.
- Set the access path of the application as displayed in the following figure:

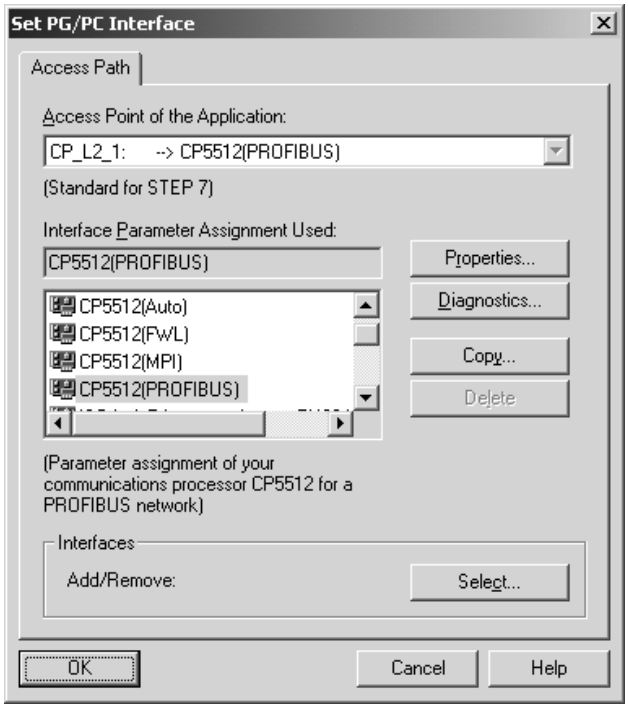


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*Figure 15: Setting the PG/PC interface*

If SIMATIC STEP 7 is installed on the computer and is started there from the program 'Set PG/PC interface', the field for the access path is deactivated. Open the window via the start menu as described above.

- Now click the [Properties] button. The following dialog box opens:

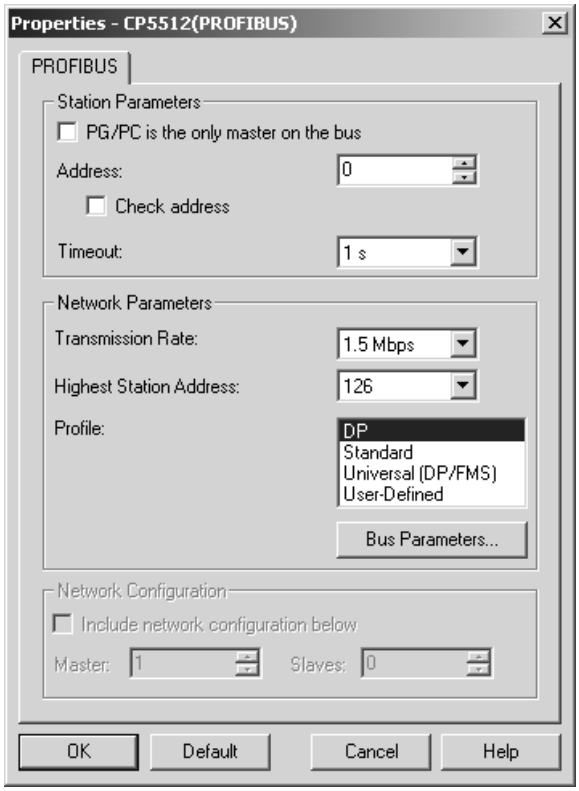


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*Figure 16: Setting properties*

- Set the required parameters and ensure that the PC (in most cases) is added as a class 2 master in an existing PROFIBUS network.
  - If a PLC is active as a class 1 master, the check box [PG/PC is the only master on Bus] must be deactivated.
  - Assign the PC a free address that is not yet reserved by other masters or slaves.
  - The baud rate must match the baud rate of the class 1 master.
- Select "DP" as the profile or set the bus timing parameters according to the existing PROFIBUS network.

- Close the configuration dialog and open the following dialog box using the [Diagnostics] button to check it.

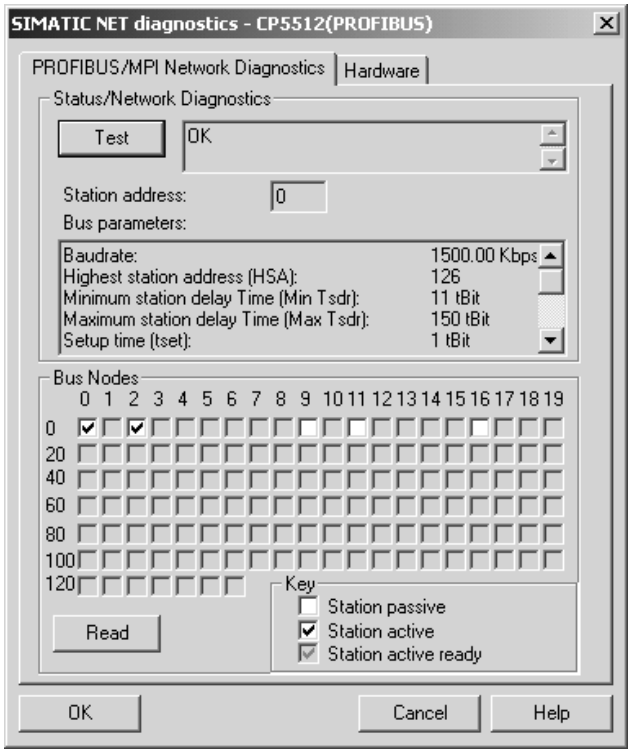


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*Figure 17: SIMATIC NET diagnostics*

Everything has been correctly configured up to now when the "OK" status is displayed after pressing the [Test] button and all devices on the PROFIBUS are displayed when clicking the [Read] button. You can now operate MOVITOOLS® MotionStudio via PROFIBUS DP-V1.

## 10.6 Configuring the SEW communication service

To operate MOVITOOLS® MotionStudio via PROFIBUS DP-V1, you require the CP5611-PC or CP5512-PC option card and the associated Softnet-DP driver package from Siemens. The PC is connected to an existing PROFIBUS network as a class 2 master and can communicate with inverters via acyclic parameter services using the DP-V1 protocol. To be able to operate the MOVITOOLS® MotionStudio via PROFIBUS, you must first configure the SEW communication server.

### 10.6.1 Establishing communication

MOVITOOLS® MotionStudio allows you to communicate with the electronics products from SEW-EURODRIVE GmbH & Co KG via several, different communication paths at the same time.

When you start MOVITOOLS® MotionStudio, you will also start the SEW communication server, and an additional icon will appear in the Windows status bar.  .

### 10.6.2 Procedure

Three steps are involved in configuring the communication:

***Step 1: Create a project and network***

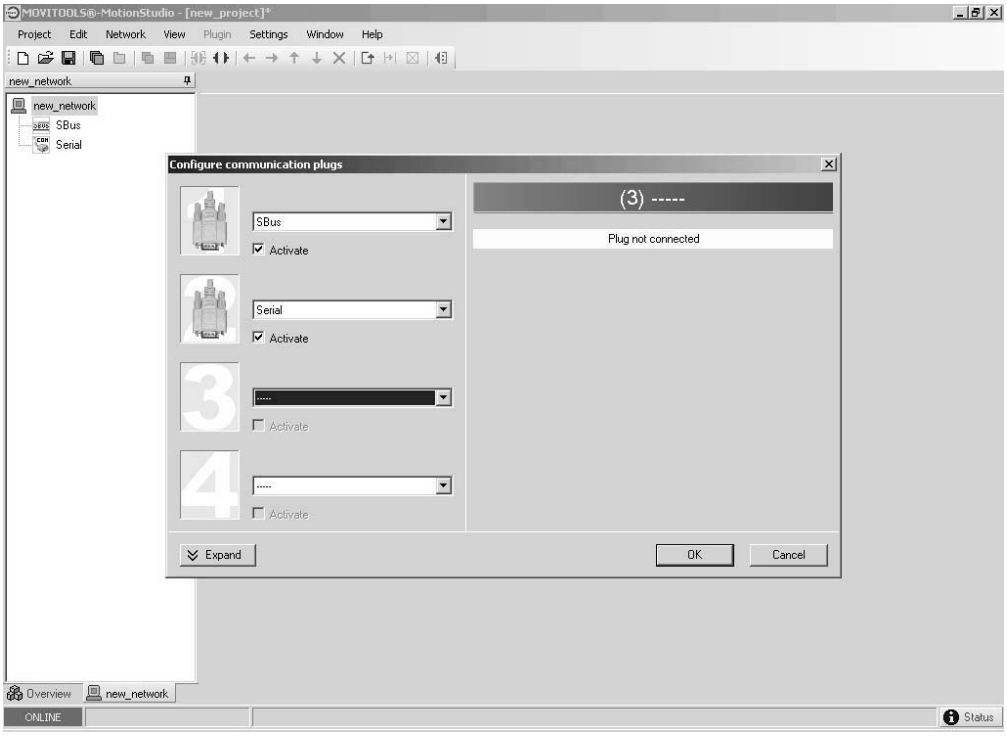
The following figure illustrated the main steps for configuring your units using the tools in MOVITOOLS® MotionStudio.

1. The 'Welcome' window launches when you start MOVITOOLS® MotionStudio, and prompts you to create a project.
2. Make sure that 'New project' is selected and confirm.

   **Result: The 'New project' window opens.**
3. Enter a name and save directory for the new project. Confirm.

   **Result:** The 'New project' window opens.
4. Enter a name for the new network. Confirm.

   **Result:** The main screen opens and the "Configure communication plugs" window appears

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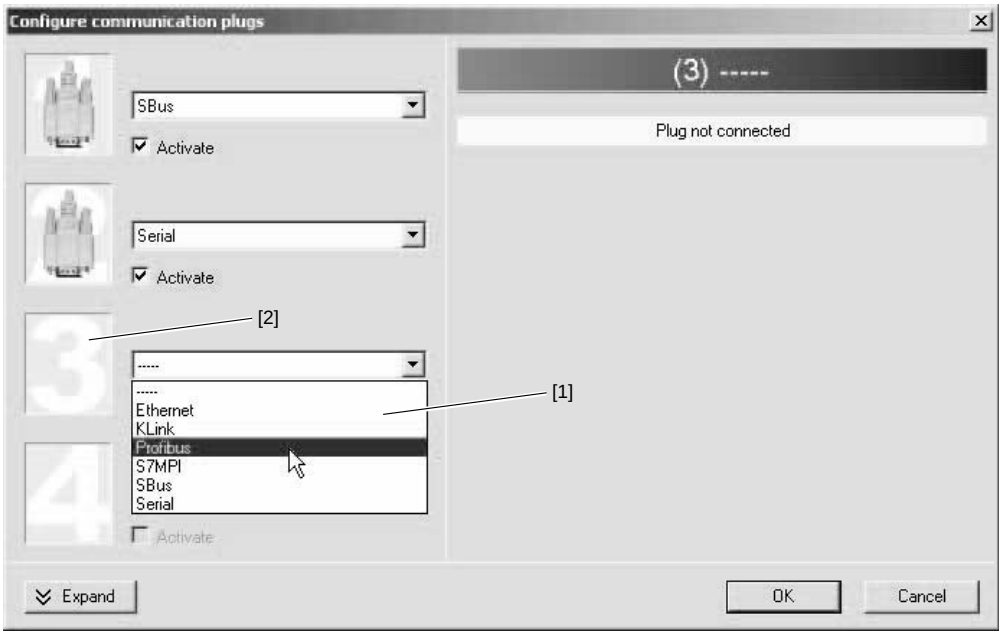
***Step 2: Configure the communication channel***

**Prerequisites**

There is a hardware connection between your PC and the units you want to configure.

**Procedure**

Choose "Profibus" as communication type from the list [1].

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**Result:** In the example, the third communication channel [2] is assigned the communication type "Profibus".

***Step 3: Scan the network (unit scan)***

1. Scan the network with (unit scan).

   After clicking the [Online Scan] button, , all configured communication channels will be searched automatically and the addressable units displayed in the unit tree.
2. If the scan does not run correctly, change the communication settings for the SEW Communication Server.

## 10.7 Known problems when operating MOVITOOLS® MotionStudio

Check the following points if problems occur during configuration:

- Is the PC connected to the PROFIBUS without violating the bus structure?
- Are the terminating resistors at the bus connectors correctly switched?
- Is the bus address of the PC still available for use?

Operation via SIMATIC NET:

- Is the check box [PG/PC is the only master on the bus] enabled/disabled?
- Is the baud rate set correctly?
- Is the access point of the application set to "CP_L2_1: --> CP5512(PROFIBUS)" in the program 'Set PG/PC interface'?
- Are the scan level settings correct in MOVITOOLS® MotionStudio under [Settings] / [Options] / [Communication]?

# 11 Fault Diagnostics

## *11.1 Diagnostic procedures*

The diagnostic procedures described in the following section demonstrate the error analysis methods for the most frequent problems:

- Inverter does not work on PROFIBUS DP
- Inverter cannot be controlled using the DP master

For more information dealing specifically with the inverter parameter settings for various fieldbus applications, refer to the *Fieldbus Unit Profile manual and the MOVIDRIVE® parameter list*. Also read the current information on the GSD disk.

**Diagnostic problem 1: Inverter does not work on PROFIBUS.**
**Initial status:**
- Inverter is connected to PROFIBUS
- Inverter configured in PROFIBUS master and bus communication is active

↓

Is the bus connector plugged in? — No → **[A]**

Yes ↓

Response of the **BUS FAULT** LED? — OFF → **[B]** / ON → **[C]**

FLASHES ↓

Inverter detects baud rate (P092 Baud rate fieldbus). However it was not configured, or was configured incorrectly, in the PROFIBUS master.

↓

Check the configured bus address and the one set using the DIP switches (P093 Fieldbus address)

↓

Are the bus addresses the same? — No → **[D]**

Yes ↓

You may have configured an incorrect unit type or defined the configuration incorrectly.

↓

Delete the project planning for the inverter from the DP network.

↓

Perform project planning for the inverter again, choosing the unit designation "MOVIDRIVE+DFS11B".
To simplify project planning, use a predefined configuration (for example, "Param + 3PD"). Do not change any of the preset configuration data!
Assign the address range for your control system.

↓

Load the configuration in the DP master and start the bus communication again.

| | |
|---|---|
| **[A]** | Check the bus cabling. |
| **[B]** | Inverter is currently exchanging data cyclically with the PROFIBUS master. P090 PD configuration displays the configuration that the inverter is controlled with via PROFIBUS. ↓ Bus communication is functioning properly (for problems with controlling or setpoint selection via PROFIBUS DP, continue with **Diagnostic problem 2**). |
| **[C]** | Inverter does **not** detect the baud rate (P092 Baud rate fieldbus)! ↓ Check the bus cabling. |
| **[D]** | Modify the bus addresses. |

**Diagnostic problem 2:**
**Inverter cannot be controlled using the DP master.**
Initial status:
- Bus communication with inverter OK (**BUS FAULT** LED off)
- Inverter running with 24 V (no supply voltage)

↓

The problem is either caused by incorrect parameter settings in the inverter or a faulty control program in the PROFIBUS master.

↓

Use P094 ... P097 (setpoint description PO1 ... PO3) to check whether the setpoints sent by the controller are received correctly.
To do so, send a setpoint other than 0 as a test in each output word.

↓

Setpoints received? Yes → **[A]**

No
↓

Check that the correct settings have been made for the following drive parameters:
- P100 SETPOINT SOURCE FIELDBUS (for MOVITRAC® B = SBus1 / fixed setpoint)
- P101 CONTROL SIGNAL SOURCE FIELDBUS (for MOVITRAC® B = SBus1)
- P876 ENABLE PO DATA YES

↓

Settings OK? No → **[B]**

Yes
↓

The problem may be caused by your control program in the DP master.

↓

Check that the address used in the program is the same as the address for project planning.
Note that the inverter requires consistent data and access must take place within the control program, if necessary, via special system functions (for example, SIMATIC S7, SFC 14 / 15).

| | |
|---|---|
| **[A]** | Setpoints are transferred.<br>Check whether the drive inverter has been enabled at the terminals. |

| | |
|---|---|
| **[B]** | Correct the settings. |

## 11.2 Error list in gateway operation

| Error code | Designation | Response | Cause | Measure |
|---|---|---|---|---|
| 17 | Stack overflow | SBus communication stopped | Inverter electronics is faulted, possibly due to EMC influence | Check ground connections and shielding and correct, if necessary. Contact SEW service if this error occurs again. |
| 18 | Stack underflow | SBus communication stopped | | |
| 19 | NMI | SBus communication stopped | | |
| 20 | Undefined Opcode | SBus communication stopped | | |
| 21 | Protection fault | SBus communication stopped | | |
| 22 | Illegal word operand access | SBus communication stopped | | |
| 23 | Illegal instruction access | SBus communication stopped | | |
| 25 | Eeprom | SBus communication stopped | Error while accessing EEPROM | Activate factory settings, perform reset and set parameters for DFS again. Contact SEW service if the error occurs again |
| 28 | Fieldbus timeout | Default: PO data = 0 Error response adjustable via P831 | No communication between master and slave within the projected response monitoring. | • Check communications routine of the master<br>• Extend the fieldbus timeout interval (response monitoring) in the master configuration or deactivate monitoring |
| 37 | Watchdog error | SBus communication stopped | Error during execution of system software | Contact SEW Service. |
| 45 | Initialization error | SBus communication stopped | Error after self-test during reset | Perform a reset. Consult SEW service if the error occurs again. |
| 111 | System error device timeout | None | Check the red system error LED (**H1**) of the DFS. If this LED is on, one or several participants on the SBus could not be addressed within the timeout interval. If the red system error LED (**H1**) flashes, the DFS itself is in an error state. In this case, error F111 was reported to the control only via fieldbus. | Check voltage supply and SBus cabling, check SBus terminating resistors. Check the project planning if the DFS was configured with the PC. Switch DFS off and on again. If the error is still present, query the error via diagnostic interface and perform the action described in this table. |

## 11.3 Error table PROFIsafe option DFS11B

| Error code/designation | | Response | Cause | Measure |
|---|---|---|---|---|
| **00** | **No fault** | – | – | – |
| **01** | **Internal sequence fault** | • F-DOx = 0 (switch off failsafe outputs)<br>• F-DIx = 0 (→ safe status)<br>• Passivation of DFS11B | Safety electronics faulty, possibly due to EMC influence | • Check installation (EMC)<br>• Switch 24 V voltage off and on again<br>• Reintegration of the DFS11B option<br>• If the fault occurs again, contact SEW service. |
| **02** | **Internal system fault** | | | |
| **03** | **Communication fault** | | PROFIsafe communication faulty | • Check configuration (e.g. PROFIsafe monitoring time)<br>• Reintegration of the DFS11B option |
| **04** | **Circuitry supply voltage fault** | | Electronics supply outside specified parameters | • Check installation (EMC)<br>• Switch 24 V voltage off and on again<br>• Reintegration of the DFS11B option<br>• If the fault occurs again, contact SEW service. |
| **50** | **Internal fault at failsafe output (F-DOx)** | • F-DOx = 0 (switch off failsafe outputs)<br>• Passivation of the DFS11B option | Safety electronics faulty, possibly due to EMC influence | • Check installation (EMC)<br>• Switch 24 V voltage off and on again<br>• Reintegration of the DFS11B option<br>• If the fault occurs again, contact SEW service. |
| **51** | **Short circuit at safe output (F-DOx)** | | • Short circuit in 24 V voltage supply or reference potential<br>• Short circuit between F-DOx_P and F-DOx_M | • Check installation / wiring and eliminate short circuit<br>• Reintegration of the DFS11B option |
| **52** | **Overload at safe output (F-DOx)** | | Overload at F-DOx (excessive current) | • Check installation / wiring and eliminate overload<br>• Reintegration of the DFS11B option |
| **111** | **Internal communication fault** | • F-DOx = 0 (switch off failsafe outputs)<br>• F-DIx = 0 (→ safe status)<br>• Passivation of the DFS11B option | Safety electronics faulty, possibly due to EMC influence | • Check installation (EMC)<br>• Switch 24 V voltage off and on again<br>• Reintegration of the DFS11B option<br>• If the fault occurs again, contact SEW service. |
| **127** | **Initialization error** | • F-DOx = 0 (switch off failsafe outputs)<br>• F-DIx = 0 (→ safe status)<br>• Passivation of the DFS11B option | • Value of F_Dest_Add is zero<br>• The DFS11B option is not compatible with the desired (configured) safety functions | • Use MOVITOOLS® MotionStudio to set F_Dest_Add to configured value<br>• Contact SEW Service |

# 12 Technical Data

## 12.1 DFS11B option for MOVIDRIVE® MDX61B

| DFS11B option (MOVIDRIVE® MDX61B) | |
|---|---|
| **Part number** | 1820 9629 |
| **Power consumption** | P = 3 W |
| **PROFIBUS protocol options** | PROFIBUS DP and DP-V1 according to IEC 61158 |
| **Automatic baud rate detection** | 9.6 kBaud ... 12 MBaud |
| **Connection technology** | • Via 9-pin D-sub plug<br>• Pin assignment to IEC 61158 |
| **Bus terminator** | Not integrated, implement using suitable PROFIBUS plug with terminating resistors that can be switched on. |
| **Station address** | 1 ... 125, adjustable via DIP switches |
| **Name of the GSD file** | SEW_600C.GSD |
| **DP ident. number** | 600C = $24588_{hex}$ |
| **Application-specific parameter-setting data (Set-Prm application data)** | • Length: 9 bytes<br>• Hex parameter settings 00,00,00,06,81,00,00,01,**01** = DP diagnostics alarm = **OFF**<br>• Hex parameter settings 00,00,00,06,81,00,00,01,**00** = DP diagnostics alarm = **ON** |
| **DP configurations for DDLM_Chk_Cfg** | • F0hex = 1 process data word (1 I/O word)<br>• F1hex = 2 process data words (2 I/O words)<br>• F2hex = 3 process data words (3 I/O words)<br>• 0hex, F5hex = 6 process data words (6 I/O words)<br>• 0hex, F9hex = 10 process data words (10 I/O words)<br>• F3hex, F0hex = parameter channel + 1 process data word (5 I/O words)<br>• F3hex, F1hex = parameter channel + 2 process data words (6 I/O words)<br>• F3hex, F2hex = parameter channel + 3 process data words (7 I/O words)<br>• F3hex, F5hex = parameter channel + 6 process data words (10 I/O words)<br>• F3hex, F9hex = parameter channel +10 process data words (14 I/O words) |
| **Diagnostic data** | • Max. 8 bytes<br>• Standard diagnostics: 6 bytes |
| **Tools for startup** | • PC program MOVITOOLS® MotionStudio<br>• DBG11B keypad |
| **F address** | See page 26 |
| **Ambient temperature** | 0 ... 55 °C |

## 12.2 DFS11B option for MOVITRAC® B and gateway housing UOH11B

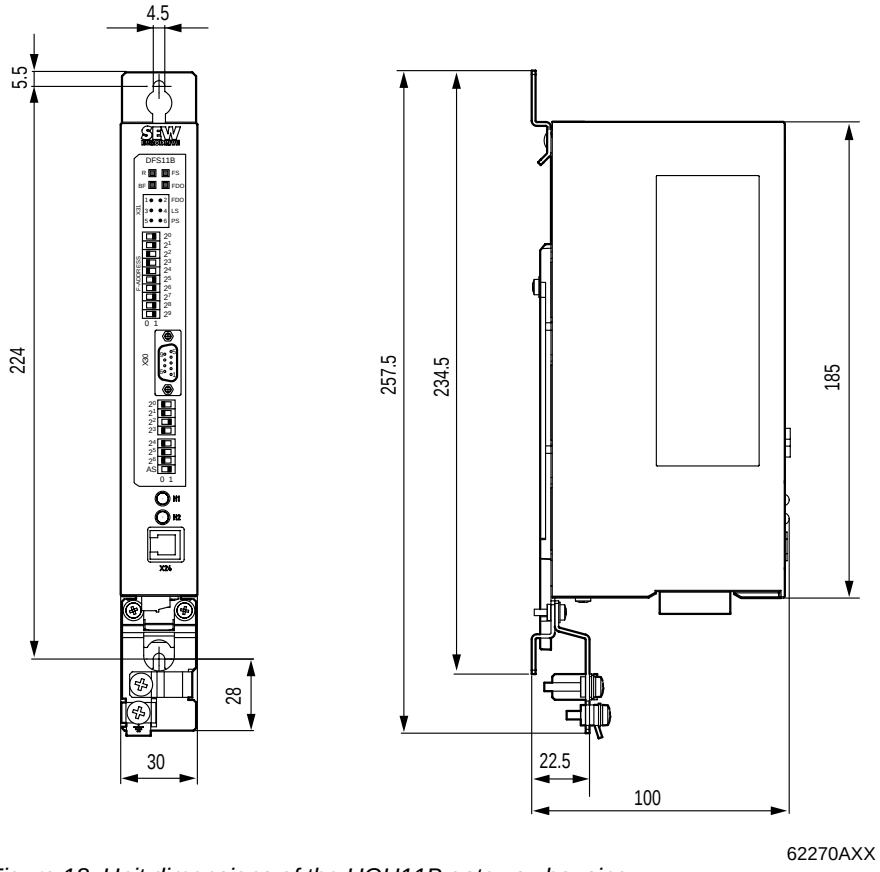


*Figure 18: Unit dimensions of the UOH11B gateway housing*

| DFS11B option (MOVITRAC® B gateway) | |
|---|---|
| **Part number** | 1820 9629 |
| **External voltage supply** | U = DC 24 V (–15 %, +20 %)<br>$I_{max}$ = DC 200 mA<br>$P_{max}$ = 3.4 W |
| **PROFIBUS protocol options** | PROFIBUS DP and DP-V1 according to IEC 61158 |
| **Automatic baud rate detection** | 9.6 kBaud ... 12 MBaud |
| **Connection technology** | • Via 9-pin D-sub plug<br>• Pin assignment to IEC 61158 |
| **Bus terminator** | Not integrated, must be implemented using suitable PROFIBUS connector with switchable terminating resistors. |
| **Station address** | 1 ... 125, adjustable via DIP switches |
| **Name of the GSD file** | SEW_6009.GSD (PROFIBUS DP-V1) |
| **DP ident. number** | $6009_{hex}$ = $24585_{dec}$ |
| **Application-specific parameter-setting data (Set-Prm application data)** | • Length: 3 bytes<br>• Hex parameter setting 00,00,00 |
| **DP configurations for DDLM_Chk_Cfg** | See section "Configuration of process data" on page 44. |
| **Diagnostic data** | • Standard diagnostics: 6 bytes |
| **Tools for startup** | • PC program MOVITOOLS® MotionStudio |
| **Ambient temperature** | 0 ... 55 °C |

## 12.3 DFS11B safety part for MOVIDRIVE® MDX61B and MOVITRAC® B

| | |
|---|---|
| **Safety features** | |
| Highest possible safety category | • SIL 3 according to EN 61508<br>• Category 4 according to EN 954-1<br>• Performance level e according to EN ISO 13849-1 |
| System structure | 2 channels with diagnostics (1oo2D) |
| Type of operating mode | "High demand" according to EN 61508 (high demand rate) |
| Probability of dangerous failure per hour (PFH value) | <1.00E-09 (1 FIT) |
| Proof test interval (EN61508) | 10 years, after which the component must be replaced with a new one |
| Repair time | 100 hours |
| Safe status | Value "0" for all safety-oriented F-DO process values (output disabled) |
| **Safe output** | |
| P-M switch<br>(from load voltage supply) | DC 24 V output according to EN 61131-2, protected against short circuits and overloads |
| Rated current | 1A |
| Leakage current (at "0" signal) | Typically –2 mA (with 2 V / 1 kΩ load resistance)<br>(Note: Current flows from F-DO_M to F-DO_P) |
| Internal voltage drop<br>(P and M output) | max. 3 V |
| Short circuit protection | Electronic, response value: 2.8 A ... 9 A |
| Overload protection | Response value: 1.4 A ... 1.6 A |
| Load resistance range | 24 kΩ ... 1 kΩ |
| Voltage limitation when switching off inductive loads | Typically –70 V |
| Response time (command via PROFIsafe → output switches) | ≤ 25 ms |
| Maximum line length | 30 µ |

# 13 Index


**A**

Additional code ....83
Auto setup for gateway operation ....47

**B**

Baud rate .... 24, 31, 125, 126
Bus termination ....32
Bus terminator .... 125, 126

**C**

C1 master
*Configuration* ....103
Characteristics of SEW inverters ....88
Communication error, internal ....84
Configuration
*C1 master* ....103
*DFS* ....54
*Process data* ....44
*PROFIBUS DP interface* ....43
*PROFIBUS option card* ....12
*SIMATIC NET* ....113
Connection
*DFS11B option* ....26
Connection technology .... 125, 126
Control
*MOVIDRIVE® MDX61B* ....71
*MOVITRAC® B* ....73
Control example ....72

**D**

Data exchange via PROFIBUS DP ....11
Data exchange via PROFIBUS DP-V1 ....11
Data exchange with the DFS11B option ....67
Data exchange with the PROFIsafe option DFS
*F periphery DB of the PROFIsafe option DFS* . 69
Data format parameter ....81
Data range parameter channel ....78
DFS11B
*Connection* ....26
*Operation indicators* ....34
*Terminal description* ....26
DFS11B operation indicators ....34
Diagnostics ....13
*Fault* ....120
Diagnostics with the PROFIsafe option DFS11B
*Error states of the PROFIsafe option DFS11B* . 58, ....124
DP configuration .... 43, 44, 125, 126
*for MOVIDRIVE® MDX61B* ....38
*universal* ....39
DP configuration "Universal Module" ....46
DP ident number .... 125, 126
DP-V1 mode ....46

**E**

Error class .... 82
Error code .... 82
Error codes .... 59
Error codes of the DP-V1 services .... 110
Error list in gateway operation .... 123
Error table PROFIsafe option DFS11B .... 124
Example program
*SIMATIC S7* ....75, 104
Explanation of symbols .... 6

**F**

F-parameters .... 56
Fault diagnostics .... 120
Fieldbus monitor .... 13
Functions
*PROFIBUS DP-V1* .... 85

**G**

Gateway operation, auto setup .... 47
Gateway operation, error list .... 123
GSD file ....42, 125, 126
*for operation in MOVITRAC® B* .... 41
*for operation in the UOH11B gateway housing* 41
*for PROFIBUS DP-V1* .... 36
*Installation* .... 53
*Validity for DFS11B* .... 36

**I**

Ident number ....125, 126
incorrect execution of a service .... 78
Index addressing .... 78
Installation
*DFS11B option card in MOVIDRIVE® MDX61B* 18
*DFS11B option card in MOVITRAC® B* ..... 21
*Installing and removing an option card* ..... 20
*UOH11B gateway housing* .... 25
Installing the GSD file .... 53
Internal communication error .... 84

**L**

LEDs .... 34
Length specification .... 84
Liability for defects .... 7

**M**

Management parameter channel .... 77
Monitoring functions .... 12
MOVIDRIVE® MDX61B
*Control* .... 71
*Installing the DFS11B option card* .... 18
*Setting the drive inverter* .... 49
*Startup with DFS11B option* .... 61
MOVITOOLS® MotionStudio

*Installation* ....112
*Introduction* ....111
*Required hardware* ....112
*Required software* ....112
MOVITRAC® B
*Control* ....73
*Installing the option card* ....21
*Setting the frequency inverter* ....50
*Startup with DFS11B option* ....64

**N**

Notes
*Assembly / installation* ....18
*Documentation* ....6
*Important Notes* ....6
*Safety* ....8

**O**

Operating characteristics at PROFIBUS DP ....67
Operating mode DP-V1 ....46
Operating MOVITOOLS® MotionStudio via PROFIBUS ....111
Option card
*Install and remove* ....20

**P**

Parameter
*Data format* ....81
*Read* ....79
*Write* ....80
Parameter channel
*Data range* ....78
*Management* ....77
*Structure* ....76
Parameter setting
*Procedure* ....81
*PROFIsafe properties* ....56
*Return codes* ....82
*via PROFIBUS DP* ....76
Parameter-setting data ....125, 126
Part number ....125, 126, 127
Pin assignment PROFIBUS ....31
Process data configuration ....44
*One module for all drives* ....44
*One module per drive* ....44
PROFIBUS
*Configuring the option card* ....12
*LEDs* ....34
PROFIBUS DP
*Data exchange* ....11
*Operating characteristics* ....67
*Parameter setting* ....76
*Parameter setting procedure* ....81
*Timeout* ....72
PROFIBUS DP-V1
*Alarm handling* ....87
*Data exchange* ....11
*Functions* ....85
*Services* .... 87
*Structure of the parameter channel* .... 89
PROFIBUS pin assignment .... 31
PROFIsafe, project planning with STEP7 .... 52
PROFIsafe® safety concept .... 14
Project planning .... 55
*DP master with MOVIDRIVE® GSD file* .... 36
*DP master with MOVITRAC® or gateway GSD file* .... 41
*PROFIsafe® with STEP7* .... 52
Project planning procedure .... 37
Protocol options ....125, 126

**R**

READ .... 79
Read parameter .... 79
Requirements
*on the installation* .... 17
Response times of the PROFIsafe option DFS
*Response sequence in conjunction with the PROFIsafe option DFS* .... 60
Return codes of parameter setting .... 82

**S**

Safe technology, wiring diagram .... 27
Safety concept
*Limitations* .... 15
*Schematic representation* .... 16
Safety concept for PROFIsafe® .... 14
Safety diagnostics using PROFIBUS DP .... 58
Safety notes .... 8
*Bus systems* .... 8
*Installation / assembly* .... 9
*Startup / operation* .... 9
*Transport / storage* .... 8
SBus
*Timeout* .... 74
Service coding .... 84
Service execution, incorrect .... 78
Setting
*MOVIDRIVE® MDX61B drive inverter* .... 49
*MOVITRAC® B frequency inverter* .... 50
SEW communication server .... 116
SEW inverters, characteristics .... 88
Shielding .... 32
Shielding and routing bus cables .... 32
SIMATIC NET
*Configuration* .... 113
SIMATIC S7
*Example program* ....75, 104
Simatic S7 .... 72
Startup MOVIDRIVE® MDX61B with DFS11B .. 61
Startup of DFS11B with MOVITRAC® B (gateway) 64
Station address ....125, 126
*Settings* .... 33
Storage .... 8

Structure of the parameter channel .....76

**T**

Technical data
*DFS11B option for gateway housing UOH11B* 126, .....127
*DFS11B option for MOVIDRIVE® MDX61B* ..... 125
*DFS11B option for MOVITRAC® B* ... 126, 127
Terminal description
*DFS11B option* .....26
Timeout
*PROFIBUS DP* .....72
*SBus* .....74
Transport .....8

**U**

Universal configuration .....46
Universal DP configuration .....39

**W**

Wiring diagram for safe technology .....27
WRITE .....80
Write parameter .....80